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NIH Toolbox Administration Manual – English version

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Introduction to the NIH Toolbox

The National Institutes of Health (NIH) Toolbox initiative sought to assemble a set of brief, comprehensive assessment tools that would be useful to clinicians and researchers in a variety of settings, with a particular emphasis on measuring outcomes in longitudinal epidemiologic studies and prevention or intervention trials across the lifespan (ages 3–85). Such a battery ensures that assessment methods and results can be used for comparisons across existing, and later with completed, studies. The NIH Toolbox basic battery divides tests into four domains: Cognition, Motor, Emotion, and Sensation. In addition, within some domains, there are also supplemental measures that can be administered.

The Cognition Domain includes measures of:

Executive Function: is defined as the capacity to plan, organize and monitor the execution of behaviors that are strategically directed in a goal-oriented manner. The NIH Toolbox focuses on the following components of Executive Function: 1) set shifting, or the capacity for switching among multiple aspects of a strategy or task; and 2) inhibition of automatic response tendencies that may interfere with achieving a goal. Fluency, or the ability to utilize one or more strategies to rapidly generate specific exemplars of a response category, is often included in Executive Functioning tasks; however, the NIH Toolbox does not include a specific measure of fluency.

In the NIH Toolbox, the Flanker Inhibitory Control & Attention Test (Flanker) and the Dimensional Change Card Sort Test (DCCS) are measures tapping Executive Function.

Episodic Memory: refers to cognitive processes involved in the acquisition, storage and retrieval of *new* information. It involves conscious recollection of information learned within a context. The term "learning" refers to the acquisition of skills and knowledge, while the term "memory" refers to the persistence of this learning over time and/or the facility with which one is able to spontaneously recall the information following a delay. Episodic Memory can be verbal, as in remembering a conversation or a list of grocery items, or nonverbal, as in imagining a place one visited or a picture one saw a week before.

In the NIH Toolbox, the Picture Sequence Memory Test (PSM) is a measure tapping Episodic Memory.

As a supplemental measure, the NIH Toolbox includes a computerized version of the Rey Auditory Verbal Learning Test (**RAVLT)** called the NIH Toolbox Auditory Verbal Leaning (Rey) Test.

Working Memory: refers to the ability to store information until the amount of information to be stored exceeds one's capacity to hold that information. Usually, working memory refers to the capacity of an individual to: 1) process information across a series of tasks and modalities, 2) to hold the information in a short-term buffer, 3) to manipulate the information, and 4) to hold the products in the same short-term buffer. This concept updates the traditional construct of "short-term memory", which refers to a passive storage buffer, to include the notion of an active computational workspace. Working Memory overlaps with constructs of attention and Executive Function.

In the NIH Toolbox, the List Sorting Working Memory Test is a measure tapping Working Memory.

Processing Speed: is defined as either the amount of time it takes to process a set amount of information, or, conversely, the amount of information that can be processed within a certain unit of time. It is a measure that reflects mental efficiency. Processing Speed is central for many cognitive functions and domains, and is sensitive to change and/or disease.

In the NIH Toolbox, the Pattern Comparison Processing Speed Test and aspects of the Flanker test are measures tapping Processing Speed. As a supplemental measure, the NIH Toolbox includes a computerized version of the Oral Symbol Digit Test (**OSDT**) called the NIH Toolbox Oral Symbol Digit Test.

Language/Reading: refers to a set of mental processes that serve to translate thought into symbols (words, gestures) that can be shared among individuals for purposes of communication. The NIH Toolbox focuses on two aspects of language.

A. The first measure is the NIH Toolbox Picture Vocabulary Test, tapping receptive word knowledge that is fundamental to learning and that also has a very high association with overall intelligence (or what has been called the "g-factor").

B. The second measure is the NIH Toolbox Oral Reading Recognition Test, tapping oral reading skill that reflects level and quality of prior educational experiences. This measure provides a fairly robust indication of verbal intelligence that is relatively undisturbed by many medical conditions that affect the brain. Reading is defined as the cognitive process of deriving meaning from written or printed text. For the purposes of the Toolbox, the specific aspect of reading to be measured is the ability to pronounce single words out of context and to recognize and name letters.

Attention: refers to the allocation of one's limited capacities to deal with an abundance of environmental stimulation and is the foundation for all other types of mental processes. There are several different forms of attention, including sustained, selective, and divided. Sustained attention is closely linked to the level of wakefulness or the maintenance of an alert state. Selective attention serves to direct sensory and thought processes to a particular stimulus or sector of the visual field so action can be taken. Divided attention is the ability to attend to more than one stimulus, spatial sector or modality simultaneously, and overlaps with Executive Function.

In the NIH Toolbox, aspects of the DCCS and Flanker Tests are used to measure Attention.

The Motor Domain includes measures of:

Dexterity: refers to the ability to coordinate the fingers and manipulate objects in a timely manner. In the NIH Toolbox, a 9-Hole Pegboard Dexterity Test is used as a measure of dexterity.

Strength: refers to the capacity of a muscle to produce the tension necessary for maintaining posture, initiating movement, or controlling movement during conditions of loading on the musculoskeletal system. More simply, muscle strength is the magnitude of force generated by an isolated muscle or a muscle group. This battery assesses only upper extremity muscle strength.

In the NIH Toolbox, the Grip Strength Test is used to assess upper body strength using a hand dynamometer.

Balance: refers to the ability to orient the body in space, maintain an upright posture under both static and dynamic conditions, and move and walk without falling. The ability to respond to internal and external disturbance, to realign body segments, as well as to protect oneself from falling is essential and inherent in everyday tasks.

In the NIH Toolbox, the Standing Balance Test is used to evaluate balance.

Locomotion: refers to the act of moving from one place to another place, reflecting ambulation ability including walking distance, velocity, and quality of gait over different environments and ground surfaces.

In the NIH Toolbox, the 4-Meter Walk Gait Speed is used as a measure of locomotion.

Endurance: refers to the ability to sustain effort that requires conjoint work capacities from cardiopulmonary, biomechanical and neuromuscular functions in the context of overall fitness.

In the NIH Toolbox, the 2-Minute Walk Endurance Test is used as the measure of endurance.

The Emotion Domain includes measures of:

Several sets of computer-administered questions that tap the following sub-domains:

Sub-domain	More Precise Aspects
Positive Affect	Life satisfaction Positive feeling states Meaning
Negative Affect	Sadness Fear Anger
Stress and Self-Efficacy	Self-efficacy Perceived stress
Social Relationships	Social support Companionship Social distress Positive Social Development

The Sensation Domain includes assessments of several sub-domains:

Pain: refers to the unpleasant sensation and emotional experience associated with actual or potential tissue damage. In NIH Toolbox, two instruments are used to measure this construct; specifically, the Promis Pain Interference CAT and Pain Intensity make up the measurement of this construct. They are both self-administered, and instructions are presented on the computer screen for each. They are presented as one measure to the participant.

Olfaction: refers to the ability to detect odor sensation, to recognize odor quality, and to identify the source of the odor. Olfaction can be measured and quantified using a variety of techniques. This battery assesses olfaction only by identification ability and measures it by presenting individuals with a variety of odorants from everyday sources in strong concentrations and asking them to choose the correct odor from a set of possible names and pictures.

In the NIH Toolbox, the Odor Identification Test is used to measure olfaction.

Vision: is generally understood in terms of contrast sensitivity, visual acuity (high contrast sensitivity), and visual field operations. In this battery, only visual acuity is assessed. Here, it refers to the eye's capacity to discriminate between different forms and aspects of an object (e.g., how big an object needs to be to be seen).

This measure is comprised of detection acuity (smallest object that can be detected), resolution acuity (smallest separation between objects that can be resolved), recognition acuity (smallest recognizable letter size that can be discriminated) and localization acuity (smallest spatial difference observed in adjacent lines).

In the NIH Toolbox, the Visual Acuity Test is used to measure vision.

As a supplemental measure, the NIH Toolbox includes a questionnaire that asks adult participants to respond to 53 items about their vision (aspects such as color vision; specific problems such as blurriness or headaches; under different conditions such as florescent lighting or night time; or while performing different activities). This measure is called the Vision-Related Quality of Life Survey (VRQoL).

Vestibular Balance: refers to the body's ability to maintain balance and orientation in space while in motion. Vestibular functioning is maintained through an inertial guidance system that regulates balance and equilibrium, involving a complex multi-sensory interplay between the brain, spinal cord, eye and inner ear. A low-cost method, using electronystagmogram (ENG), was developed for this battery.

In the NIH Toolbox, vestibular balance is assessed by the Dynamic Visual Acuity Test (DVA).

Audition: involves both the physical processing of acoustic signals (e.g., intensity and frequency) and their psychological percepts (e.g., loudness and pitch). In the process of hearing, people detect, discriminate and localize a wide variety of stimuli, including linguistic sounds (e.g., speech syllables, words, sentences), and non-linguistic sounds (e.g., clicks, tones, music).

The NIH Toolbox includes an automated test of auditory sensitivity using pure tone signals that allows classification of the hearing of test participants as either normal or in terms of the degree and configuration of hearing loss.

In the NIH Toolbox, the Hearing Thresholds Test is used to measure audition.

The NIH Toolbox includes two supplemental measures in the Audition sub-domain. The first is a computer-based measure of speech (figure/ground) discrimination called Words in Noise Test. The second is a questionnaire, Hearing Handicap Inventory, that has slightly different versions for adults (ages 18-64) and the elderly (ages 65-85).

Taste: refers to the perception that arises from stimulation of taste receptors found most frequently on the tongue and throughout the oral cavity. This battery uses a measure of taste sensitivity that examines the experience of tasting salty and bitter solutions on the tip of the tongue as well as in the whole mouth.

In the NIH Toolbox, the Regional Taste Intensity Test is used to assess taste.

Test Development and Scoring in the NIH Toolbox

Several recent advances in test construction have been utilized in the development and scoring of the NIH Toolbox measures. Two of these, Item Response Theory (IRT) and Computer Adaptive Testing (CAT), are outlined below in simple terms.

All psychological/educational measurement or testing requires the concept of an underlying (latent) trait that can be expressed in terms of more or less. Traits are characteristics of a person and can include attitudes as well as knowledge or ability. We use test items to measure traits. To do this, test items are ordered from easy to hard and test takers can be ordered from less able to more able.

In classical test theory (CTT), an individual takes an assessment and his/her score on that assessment is used for comparison purposes. The higher the person scores, the higher he/she is on (has of) a trait; the lower a person scores, the lower he/she is on (has of) a trait.

In CTT, measurements are considered to consist of true scores plus an error score. Both the person to whom the item is administered and the item itself influence the probabilities that determine the make-up of a particular item response. It is impossible to separate or parse out the person's contribution to an item score and the item difficulty.

In IRT, a trait is described as an unobservable dimension that is thought to give rise to a set of observed item responses. These traits are measured on a continuum with equal intervals; item calibrations are independent of the test-takers used for calibration. Test–takers and items are represented on the same scale: namely, item-difficulty = severity = measure = theta = item calibration = location and person-ability = measure = theta = person calibration = location.

In IRT, each individual item can be use for comparison purposes; persons who correctly endorse "hard items" are higher on (or have more of) that trait; persons who endorse "easy items" are lower on (or have less of) that trait. Items measuring the same construct can be aggregated into longer assessments.

In CTT, reliability is a single estimate and is based on the total test; a corresponding standard error of measurement exists, and the precision of measured reliability is known to vary at different ability levels. In contrast, in IRT, reliability is calculated for each person's ability and varies across the continuum; typically, reliability is better at the middle of the distribution.

In CTT, validity is based upon the total test and needs reassessment if the instrument is modified in any way. In IRT, validity is assessed for the entire item bank and is conferred on any subset of the items used (short forms, CAT, etc.).

Knowing more about each item allows test creators to construct CATs that are shorter and more precise than traditional tests. Knowing a test-taker's response to a given item, the test creator can then present the next item in a manner that targets the specific goal of the test. That is, if one is testing for a given trait, one can present the next item that represents more or less of that trait based on how the person responded to the previous item. Using this technique, the tester/researcher can give a minimal set of items that hones in on the trait being measured. There are no restrictions on the trait; it can be knowledge-based (such as reading) or attitudinal (such as anger).

From:

Hays et al: IRT & Health outcomes measurement in the 21st century

Gershon: IRT & CAT (assessment center training)

Introduction to Assessment Center

Introduction

Assessment Center is a free, online research management tool that allows a user to access a library of patient-reported and examiner-administered instruments. The instrument library includes measures from the Patient-Reported Outcomes Measurement Information System (PROMIS) and the NIH Toolbox.

Assessment Center also allows a user to set up a study-specific website to collect data from participants on library or custom instruments. Data can be exported at any time during accrual. Many other features are available, such as reviewing item and instrument statistics and previewing how a computerized adaptive test (CAT) is administered and scored. Refer to Help within the application (upper right corner hyperlink) or the Assessment Center User Manual for detailed instructions.

Note that Assessment Center works best using Internet Explorer. You can use Assessment Center on a mac computer, but not all of the NIH Toolbox instruments are compatible with macs. Refer to NIH Toolbox materials for more information.

Login and Studies

Assessment Center Homepage

The Assessment Center homepage (www.assessmentcenter.net) houses a number of useful resources including announcements, the Assessment Center User Manual, FAQs, and the customer service contact info.

Login

To work within the Assessment Center application, you must first register by creating a User ID and password and by providing contact information.

If you wish to utilize NIH Toolbox instruments and Assessment Center, you will need to register as a new user. To do this, navigate to www.assessmentcenter.net and click on the Register New User hyperlink in the upper right corner. You will also need to enter a study name. It is a good idea to use a study name like "[name]pilot" or "[name]practice" when learning the system. This will keep your true study name for data collection later. *You must login at least once to complete the registration process. If you create a registration record but do not login, your name will not appear on the Assessment Center user list.*

Login

1. Navigate to Assessment Center Training site.
2. In the top right corner, enter the provided login and password. Click Continue.

Studies

The first screen accessed upon logging into Assessment Center is in the Studies tab. All work within Assessment Center is organized within a study. You may have multiple studies, although study names must be unique within Assessment Center. You will see studies which you have created or studies in which you have been identified as a team member in the Study List. The list shows the most recently accessed study first and then all others alphabetically by study name. For our training, when you first login there will be a study that doesn't contain any instruments or batteries yet ("ToolBoxPractice##").

You may select any study from this list by clicking the hyperlink of the study name. We suggest flagging your study name with the word "practice" or "training." Save your real study name for when it is time to collect data. If you don't see the study name on the study List when you login, it is because another user already created a study with that name.

Create New Study

1. Click Create button to generate a blank Study Properties page
2. Complete Study Properties fields
3. Click Save button

If you want others to have access to your study (e.g., provide feedback on set-up, recruit participants, export data, use instruments you created), it is important to add them to your study team. To specify a study team, click on the Team hyperlink and select team members from the All Users list. You will want to determine each team member's role on the study at the time of study creation, although team members may be added and removed or have roles changed at any time. New team members are automatically assigned the role of Associate. This role has read-only access to study elements. You will want to reassign roles to give appropriate permissions to your team members. To do so, a team member's name should be selected, and then the Roles box that best suits each team members' responsibilities should be checked.

Assign Team Members to Study

1. On Study List page, click Team link
2. Highlight Team member's name on All Users list

Add a NIH Toolbox Battery to a Study

Navigate to the Instruments tab and you are on the Study Content page. The main purpose of this page is to display all the instruments within a study.

Search for Instruments

To add instruments to a study from the Assessment Center instrument library, click on the Add button. You will then be taken to the Add an Instrument page. Assessment Center houses **instruments** (e.g., a depression short form) and **batteries** (collections of instruments). NIH Toolbox has batteries for Emotion, Motor, Cognition, and Sensation on batteries for most of this workshop as these are the instruments experts feel provide the best assessment of patients.

On the Add an Instrument page, you will first need to decide if you want to search for instruments or batteries. Start by selecting Battery. The page will re-populate to show the available batteries. To view the content of a battery, click on the plus sign next to the battery's name. This will display a list of the included instruments.

To pick a battery for inclusion in a study, check the box next to the battery name. You may select multiple batteries. After selections have been made, click on the Add to Study button at the top or at the bottom of the results list. You will receive a confirmation message that selections have been added to your study.

Pick a Battery for a Study

1. On the Study Detail page, click Add button
2. Select Battery
3. Select an NIH Toolbox study
4. Select an NIH Toolbox battery by checking box
5. Click Add to Study button

If all required batteries have been included, you may navigate back to the Study Content page using the "breadcrumbs." Breadcrumbs are navigation tools (hyperlinks) located in the top left corner of the page.

Automatic Inclusion of Education and Handedness Instruments

All NIH Toolbox instruments were normed by level of education. Therefore, when any NIH Toolbox battery or instrument is added to your study, it will automatically include an education instrument. The education instrument **MUST** be administered prior to the NIH Toolbox instruments in order for the correct instrument administration and scoring to occur. For example, in language tests, education level determines where to begin the presentation of items. For children under the age of 18, a second education instrument about parental education is included. Parental education was used in norming for this age group.

Additionally, some instruments (Cognition, Motor) were normed for use of one's dominant hand. Depending on the battery or instrument, a handedness instrument may be included automatically. This instrument includes a series of questions (e.g., what hand is used to write, to throw a ball) if the respondent doesn't know the dominant hand. The handedness instrument should be administered prior to the NIH Toolbox instruments, so don't move it to be later in the assessment. If you are selecting individual NIH Toolbox instruments rather than using an entire battery, you may need to include the education and handedness instruments where needed.

Enabling Data Collection in Spanish

Assessment Center allows a researcher to set up a study website to enable collection of participant data. This encompasses establishing study parameters (e.g., target sample size), defining assessments, and adding online consent forms. The Set-up tab is used when you have finalized instruments and are ready to set up a study-specific website for collecting participant data. When first navigating to the Set-up tab, please take notice of the sub-menu tabs immediately under the larger navigation tabs Language, Basic, Advanced, Consent, Registration. These sub-menu tabs can be used to navigate within the Set-up tab.

Language

The default page and first sub-menu tab is the Language page. This page allows you to select the language(s) in which your study will be administered to participants. You may select multiple languages. When multiple languages are selected, participants will be asked to select their preferred language at the beginning of each assessment. The Language page requires only one action; indicate which languages will be available to participants during data collection. The language options on this page are determined by the language setting on the Instrument Properties page and the language indicated when uploading translations on the Instrument Detail page.

Establishing Language for data collection

1. Navigate to the Language sub-menu tab
2. Click the languages participants may utilize in data collection
3. Click Save

Basic Set-up

The second sub-menu tab, Basic Set-Up, allows you to enter study information such as sample size and study web page address. On this page you are also asked to enter text and, if desired, an image which will appear on your study's homepage. It is important to review Basic Set-up default values. Most likely, these will need to be modified.

- **Start Date**: tells the system when to open for data collection.
- **End Date**: tells the system when to close data collection; default equals one year after the start date.
- **URL Extension**: unique portion of web address where participants will go to access the study; default equals study name, e.g., assessmentcenter.net/ac1/assessments/studyname.
- **Close data collection when sample size equals**: data collection ends when the number of participants specified here have accessed the site; default equals 25.
- **Contact information for participant questions**: informs participants how to contact study staff; default equals study creator's email.
- **Login Screen Welcome Screen**: text participant sees when navigating to study-specific website; default equals "Welcome to" <Insert Study Name>.

Establishing Basic Study Parameters

1. Navigate to the Basic Set-Up sub-menu tab
2. Review default values in set-up fields
3. Modify set-up fields as necessary
4. Click Save

Setting up Multiple Timepoints

The third sub-menu tab, Advanced, allows you to set up a more complex data collection platform. Advanced Set-up should be used for studies that have multiple assessments or timepoints, multiple arms like intervention and control, or studies in which instruments should be administered in a random order. We will focus first on setting up multiple timepoints.

The Advanced Set-up defaults to having one arm and one assessment (timepoint). To add new arms or assessments, click on the New Row button.

- **Arm**: defines each study arm. A participant is assigned to only one arm (e.g., intervention or control). If you don't have two study arms, make sure to use the same text in the arm field (e.g., "arm A"). One study arm should be entered per row, per assessment.
- **Assessment**: used to specify the assessment number of each arm entry. For example, a study with a baseline and one-month follow-up assessment has 2 assessments. One row should be numbered 1 and the second row should be numbered 2.
- **Day Assessment Opens**: designates when an assessment will be made available to study participants. An assessment opens a specified number of days after the first (baseline) assessment begins. This field is not applicable for the first assessment.
- **Window**: used to establish how many days an assessment will remain open to study participants.

Establishing Additional Timepoints

1. Navigate to the Advanced Set-Up sub-menu tab
2. Add another row(s)
3. Modify assessment number, day assessment opens and window defaults
4. Click Save

Add a Consent Form

Assessment Center enables a researcher to collect a total of three online consent forms. Participants can indicate consent through marking a checkbox and/or typing in his/her name. A view-only option is available as well. Consents can be made available in all languages selected on the Language sub-menu tab (e.g., English and Spanish).

Add Consent Forms

1. Navigate to the Consent sub-menu on the Set-up tab.
2. Check Include box in Consent 1 header.
3. Indicate whether to include an endorsement checkbox.
4. Modify endorsement checkbox text if applicable.
5. Indicate whether to include an endorsement text entry
6. Modify endorsement text entry text if applicable.
7. Paste consent form text into consent form content textbox.
8. Repeat if necessary.
9. Click Save button.

Setting up Patient/Participant Registration

The fifth sub-menu tab, Registration, allows you to select which registration data fields should be administered to participants as part of self-registration and which registration information will be required. Registration items are presented to participants prior to the study instruments. Participant Registration is used to collect participant demographic and contact information. For NIH Toolbox instruments, age is collected here and used to tailor instruments (e.g., start adults with harder vocabulary items).

You may tailor the registration information collected within a study. The Registration page lists all available registration questions. You may select the registration questions most applicable to your study. You may also determine if each registration question will be required. Requiring an item will prevent a participant from moving on to the next item if a required question has not been answered.

You have the option of adding five custom registration questions. There is a custom field for a date response, two for a numeric response, one for a text response and one for a drop list. You may also add validation for Age. The values entered into the Min/Max fields will set the minimum and maximum values accepted.

Define Registration Fields

1. Navigate to the Registration sub-menu of the Set-up tab
2. Select additional registration questions to be included in study
3. Determine whether questions should be required and check Required box
4. Add Custom field labels, if applicable
5. Enter all Min/Max validation values, if applicable
6. Click Save

Preview and Launch

After study content and set-up parameters have been established, a study is ready for data collection. The Preview tab allows you to first preview your study as it would appear to participants, then finalize and launch the study for data collection.

Preview Study

Once a study is launched into data collection (Launch button is clicked on Launch page), study content and certain study parameters **cannot be changed**. Therefore, it is essential to review your study using the Preview feature prior to launch. The study should be previewed by all pertinent study team members to ensure all required changes are captured.

The Preview Study page allows you to see your study from the participant's viewpoint. First, you may opt to view response scores during preview. This is helpful in confirming the correct scoring for each response option is present. Participants won't see the response scores once the study is launched. Next, you may export a study configuration report which details elements established on the Advanced Set-up tab. Definitions of study configuration report fields are available in the Assessment Center User Manual and online help. Finally, you may review study elements in the Study Set-up Summary on the Preview page.

To preview your study as a test participant, click on the Preview button. A window will appear noting the progress of the launch to preview. Once complete, you will be navigated to a preview data collection platform.

You must approve both the study configuration and preview prior to moving to the Launch tab. To approve, check the box in the Approve column. Your approval will be date stamped.

Preview Study

1. Navigate to the Preview tab
2. Select yes/no to viewing response scores (functional for patient-reported instruments)
3. Click Preview button
4. Complete first participant assessment.

Launch Study

The Launch page is where a user deploys a study into the data collection phase. Once the Launch Study button is clicked, **no changes may be made to the study content and most study set-up elements**.

Prior to initiating data collection, click on the © to review and accept Terms & Conditions for any instruments you have included. Once this is done the Launch Study button will be enabled. After Launch Study has been clicked a launch progress pop-up will appear detailing the percentage of your study that has been launched to your data collection platform. A message will appear that includes the study hyperlink.

Launch Study

1. After approving the study configuration report and preview, navigate to the Launch sub-menu from the Preview tab
2. Accept Terms & Conditions (if applicable)
3. Click Launch Study button

Data Collection Website

After you click the Launch Study button, the system will take a short amount of time to establish the website and data collection forms. You can view the study website by navigating to: www.assessmentcenter.net/ac1/assessments/<URL Extension>.

This web address (URL) can be given to study participants so that they may access the study website. If multiple languages were checked on the Language page, the first page a participant will see when navigating to your study website will ask them in which language they would like to complete the assessment. Otherwise, they will initially be navigated to your study homepage. The homepage of the website will welcome participants to the study with any text entered into the Welcome dialog box on Basic Set-up. Participants will be able to proceed by clicking on the Start button. If a participant has already begun the study, s/he may enter his/her login and password on the welcome page. S/he will be navigated to the next assigned assessment or the page where s/he stopped in the study instruments.

Study participants/patients will then see the consent form and registration questions. Next, an instruction screen will appear with the participant's assigned login and password. Participants are advised to write these down so that they may access the study again if they do not finish the assessment in one sitting or if there is more than one assessment. The login which appears on this page is a randomly generated 5-digit number and the password is a randomly generated combination of three letters. If you wish to set a participant's login and password, a researcher can register him/ her through the researcher interface (see Assessment Center User Manual).

Administration - Accrual

The Administration tab helps manage study data and participants once a study is in the data collection phase. The default page on the Administration tab is the Study Overview page that provides accrual information and data exports.

Accrual Dashboard

The accrual dashboard allows the study team to quickly assess total accrual, complete cases and response rate.

Data Dictionary and Accrual Report

There are three group reports provided to every study. These reports are accessed by clicking on the report name hyperlink from the Study Overview page. They open as PDFs.

- **Data Dictionary Report**: lists all item IDs, item content, and response scores from your study.
- **Enrollment Report**: provides detailed information about current study accrual, count of completed, count of refusals, counts by gender, race and recruitment site.
- **NIH Inclusion Enrollment Report**: details accrual by cross-tabulating gender with race and ethnicity information. The format adheres to the requirements from the National Institutes of Health for periodic progress reports.

Administration - Exporting Data

Five data export options are available within the Administration tab. Data exports are made available once you click the Request button. Once the export is generated and available on the Study Overview page, an email will be sent to the email listed in email notification field above the Request buttons. After you receive the email, you may click the Download button. This will open a CSV file. This file can be opened in Excel or a statistical software package. Most computers with Microsoft Office will automatically open the file in Excel.

- **Export Assessment Data**: contains all of the raw data for the study including time/date stamps for all responses, number of seconds to respond, etc.
- **Export Assessment Scores**: contains instrument level scores for instruments in the Assessment Center library (e.g., T-Score for a PROMIS Fatigue short form). Custom instruments that are made by an individual researcher are not scored.
- **Export Registration Data**: contains all registration data for a particular study (e.g., race, gender, name).
- **Export Registration Consent Data:** contains information provided during consent form endorsement.
- **Pivoted Assessment Data:** contains all responses with each participant in a row and items in columns

The data exports for NIH Toolbox instruments are complex. You will see a raw score, a scale score, and typically a score that has been adjusted for age or age plus other demographics ("fully adjusted"). For some instruments, there are unique scores (e.g., score for dominant hand and non-dominant hand). To learn more about the scores, refer to the NIH Toolbox Scoring Manual on nihtoolbox.org.

Creating Practice Studies

Creating a number of practice studies is the best way to learn the features of Assessment Center. At this point, you have learned the basics of creating a study, selecting instruments, setting up the data collection URL, and managing accrual and data exports.

Assessment Center instruments are assigned to one of three access categories.

First, some instruments are publicly available to all Assessment Center users. These instruments are under the status "public" and can be viewed by selecting "All Public" on the Study name drop list on the Add an Instrument page. PROMIS is one collection of instruments that are publicly accessible.

Second, some instruments are available to Assessment Center users by special permission. The NIH Toolbox instruments fall into this category. In order to have access to these instruments, you need to be added to the list of approved individuals. You will need to complete the registration form on the NIH Toolbox website (www.nihtoolbox.org) to gain access.

Third, instruments that you create from scratch in Assessment Center (e.g., typing in new text by following the instructions outlined in Module 13: Creating a Custom Item in a Custom Instrument) are available only to you. You can add them to other studies you create. Other investigators that are part of your study team can also access these instruments. On the Add an Instrument page, select the study where the instrument was created to find a previously used custom instrument. More details are included in the section entitled: Re-using Custom Instruments.

Creating a Custom Item in a Custom Instrument

Create New Instrument

The main purpose of the Custom Instrument feature is to add instruments not in the Assessment Center library to your data collection site. This is often a demographics form, a clinical form, or perhaps another patient-reported outcome instrument like the FACIT-Fatigue. A custom instrument should be created if one wants to enter a published instrument not in the library or write new items. A custom instrument is only available to study team members. Once created, it can be added to team members' other studies. You will first create the Custom Instrument and then create items to fill that instrument.

You may create a Custom Instrument from the Study Content page by clicking on the Create button. The first step in creating a custom instrument is to complete the Instrument Properties page. Once you have done this, you will be navigated back to the Study Content page. Here you can verify that your custom instrument has been created.

Create an Instrument

1. In an un-launched study, on the Study Content page, click Create button
2. Provide an Instrument name (must be unique in Assessment Center).
3. Select Instrument Type (in almost all cases, Short Form)
4. Assign one or more Instrument Domains
5. Enter an Instrument Description
6. Click Save

Create New Items

You can create new items within a custom instrument. To do so, on Study Content, click the hyperlink name of the instrument you just created. This will navigate you to Instrument Detail. Click the Create Item button. You will be navigated to Item Detail.

On the Item Detail page, you will need to enter a unique Item ID, context (if applicable – e.g., "In the past 7 days…"), stem (e.g., "I have been bothered by a lack of energy") and scores/responses (e.g., 1 = Not at all, 2 = Somewhat). There are several response types you can choose from. Descriptions are in the Assessment Center User Manual.

Multiple Choice (default)	Drop List	Comments
Checkbox List	Numeric	Informational
Date	Text	

After you select response type, enter the score and response text for each response option. You may add an additional response option, where applicable, by clicking on the Add Another Row button within the Responses box.

Create New Item for a Custom Instrument

1. On Study Content page, click on the instrument name hyperlink
2. On the Instrument Detail page, click Create Item button
3. Enter Item ID
4. Select Domain(s)
5. Enter context (if applicable) & stem
6. Select Response Type
7. Add additional response rows (if applicable)
8. Enter Response Score and Content (for multiple choice, checkbox list, drop list)
9. Click Save
10. Enter Item History comments (if desired)
11. Click Save on Item History dialog box
12. Add additional new items as needed

Once an item is created, you may navigate back to the Instrument Detail page to proceed with study development or continue to create new items from the Item Detail page. To create additional items from an existing item, click the New or Copy button on the Item Detail page.

Creating Items/Instruments for Researchers to Complete

You can use the same process of creating custom items in a custom short form to include information that a researcher or clinician would complete. This means that the short form is not seen by the participant. Instead, it can only be accessed from the researcher interface. A researcher can use this functionality to include a patient identification number that may be used in other systems. This will help link data between different databases. Another way this feature is used is to record scores from instruments administered on paper or elsewhere into the Assessment Center database. This allows a researcher to have all data on a participant stored in the same database. You will first create the items you want and then set up the instrument to only be seen by the researcher.

After you've created an instrument that is to be completed only by the researcher, you need to navigate to Study Set-up to indicate it is a clinician-completed instrument. Under the Set-up tab, navigate to Advanced. Click on Specify Instruments for each Arm/Assessment. You will see a "Completed by Participants" checkbox. By default, it is checked so that participants are presented the instrument. Simply uncheck the box for instruments that are completed by study staff. Data may be entered on the Participant Data page within the Administration tab.

Establish Instrument Completed by Researcher

1. Navigate to Advanced Set-up. Click on Specify Details for a given Arm/Assessment
2. Uncheck Completed by Participant for the clinician-completed instruments
3. Click save

Entering Data from the Researcher Interface

The Administration tab allows for a researcher with appropriate permission to review and enter participant-level data. For example, a study team member may want to add a participant's ID used in another system or add a score from an instrument completed elsewhere. This is done on the Participant Data page. The Participant Data page is **NOT** intended for participant self-report or researcher interview. The instrument administration engines and customization (templates, branching, randomization) are **NOT** integrated into the Participant Data page.

The Participant Data page displays a list of all applicable assessments on the left panel of the page. Clicking on the name of the assessment will expand the list to show all of that assessment's instruments. The text color indicates where a participant is within the study schedule. Assessments that are listed in red occurred in the past, i.e. the participant is no longer in the defined assessment window. Assessments that are listed in green are currently open. Assessments that are listed in black occur in the future and are not currently available. If a line is crossing off an instrument, the participant viewed all items within that instrument. This could mean that a participant completed the instrument, or viewed each item but chose to skip it without answering.

To review or enter participant data for a particular assessment and questionnaire, click on the applicable assessment, then the instrument name. This action will open the questionnaire in the main panel of the page. You can use the scroll bar on the right to navigate to see every item in the instrument. If you are entering data using these screens, be sure to click on the Save button before moving on to the next instrument. To be able to view the Participant Data page, staff must have the Study Administrator or Study Participant Administrator. To be able to modify participant data, staff must have the Study Data Entry Administrator role.

Researcher Data Entry

1. Access a launched study
2. Navigate to Administration
3. Click on Participant list and select a participant (click hyperlink)
4. Navigate to Participant Data sub-menu tab
5. Select desired assessment and instrument on the left
6. Complete data entry for clinician-completed instrument
7. Click Save

Re-Using Custom Instruments

Once you have created a custom instrument and launched that study, you can add that same instrument to other studies. To add the instrument to an un-launched study, navigate to the Instruments tab. Click the Add button. Use the Study field to search for other studies where you created instruments. Click Show Results to re-populate the page with search results. Only those instruments that have been administered or are available to the public will be included in search results.

Note that all NIH Toolbox instruments are only available to those who have permission. In order to gain permission, complete the registration process at nihtoolbox.org. After providing brief information, you will be granted access.

Building your own NIH Toolbox Assessment Rather than Using a Battery

Toolbox investigators created batteries for Emotion, Cognition, Motor, and Sensation to provide a comprehensive assessment in a given area. At times, a clinician or investigator may wish to create a custom Toolbox assessment that does not match the content of a battery. You can do this within Assessment Center through adding individual instruments to a study. Start in an un-launched study. Navigate to the Instruments tab and click Add. Instead of selecting Battery, select Instrument. You can then use the search criteria on the Add an Instrument page to find instruments within a Toolbox study (NIH Toolbox Emotion, NIH Toolbox Cognition, NIH Toolbox Motor, NIH Toolbox Sensation) or within a given domain.

As noted before, all NIH Toolbox instruments require that the NIH Toolbox education instrument is included. Additionally, some instruments require the inclusion of the handedness instrument in order to be administered and scored correctly. When you are building your NIH Toolbox assessment rather than using a battery, you must include the required education and handedness instruments. They should be administered first so that Assessment Center knows where to start a given instrument (e.g., begin with appropriate level of vocabulary word).

Creating a Custom Toolbox Assessment

1. In an un-launched study, navigate to Instruments and click Add
2. Select Instrument (rather than Battery)
3. Use the search criteria on the page to search for Study=Toolbox or the desired domain
4. Click Show Results
5. Check the box next to the desired instrument names and click Add to Study
6. Navigate back to Study Content using breadcrumbs at the top of the page

Tailoring Assessment Content by Timepoint

Some studies may wish to have different instruments included at different timepoints. For example, demographics are likely not needed at follow-up assessments. This feature is included on the Advanced Set-up tab.

From the Set-up Tab, navigate to Advanced. Previously in the section entitled: Setting up multiple timepoints, you learned how to establish multiple timepoints and study arms using this page. The Specify Instruments hyperlink will navigate you to the Arm/Assessment Details page. This page allows control over what instruments are included in a given timepoint, their order, and who should complete them. The Arm/Assessment Details page should be completed for each arm/assessment combination.

- **Instrument Block**: used to group instruments together or to indicate the instrument will not be included in an assessment. The default equals one. Instruments in the same block are presented together.
- **Block Administration**: used to designate whether a block of instruments should be administered in a fixed or random order. The default is fixed.
- **Instrument**: a label which provides the name of each instrument in the study.
- **Order within Block**: designates how instruments within a block will be administered to participants. The default is sequential ordering within the block.
- **Completed by Participant**: used to indicate whether an instrument should be administered to a participant. The default is checked, meaning that the instrument should be administered to a participant. Unchecking will make it available only through the researcher interface for data entry.
- **Administer**: used to reduce duplication between study instruments. This is most often used when instruments within the same domain are administered in the same study (e.g., Anxiety CAT and Anxiety short form).

Tailoring Assessment Content by Timepoint

1. Navigate to Set-up/Advanced
2. Click on Specify Instrument hyperlink for selected assessment
3. Determine whether each instrument should be included in this assessment
4. Click Save

Researcher Registration of a Participant

When a participant goes to a launched study URL and completes the registration fields, this is called Participant Registration or Self-Registration. When this happens, Assessment Center generates a five digit login for that participant. Sometimes, however, a researcher may want to register a participant through the researcher interface of Assessment Center, not the launched study URL. This would be done if a researcher wants to select the login/password (e.g., to match a login/PIN used in another database), force an assignment to a specific study arm, or track who receives a given login when the study is not able to collect identifying information in Assessment Center.

To have a researcher register a participant, you need to create a new registration record. To do this, navigate to the Administration tab for a launched study. Click the Find/Search button. On the Registration Details page, check the box "Create participant login" and enter the login along with password. Set Consent = Yes. Click on the Participant Details submenu tab. Complete all of the required registration fields. Remember that NIH Toolbox requires that you provide age, race, ethnicity and gender. Access Contact Information and Custom Fields submenu tabs if registration fields on those pages are required. When you have entered the last piece of information, click the "Register Participant" button at the bottom of the screen. The login will appear at the top of the registration page in bold blue text.

When generating a participant login, you will have the option of creating a participant's login or having the system assign a login. If the system assigns the login, it will be a random 5 digit number. If you opt to create the login, you will need to first check the create participant login box and enter an alphanumeric login 5-10 characters long.

Researcher Registration of a Participant

1. In a launched study, navigate to Administration
2. Click on Find/Create Login
3. Check the "Create participant login" box. Enter all required fields on Registration Details.
4. Navigate to Participant Details sub-menu tab
5. Complete all required fields
6. Navigate to Contact Information and Custom Fields if needed and complete all registration fields
7. Click Register Participant button at bottom of page
8. See confirmed Login in blue in the upper right of the screen

Marking a Participant as Practice ("Test")

In order to learn how to administer NIH Toolbox instruments, it is strongly recommended that you practice prior to working with a patient/participant. It is easiest to do this in the study you plan on using for actual data collection. However, you don't want your practice data to be included in the dataset you will later use for analyses. Therefore, you will need to flag these logins as practice or "test" participants. In a launched study, navigate to the Administration tab. On the Overview page, click on the Participant List button. Click on the hyperlink next to the test participant's login and password. If you collected name in Registration, the hyperlink will be the participant's name. If not, it will be "zzzMissingMissing". You are navigated to the Participant Details page. Consent status should be changed from "Yes" to "Test." Click Register Participant to save the change. In all data exports, you will want to only analyze those participants who have a 1 in the Consent field. Other values (2= No consent, 3 = test participant, 4 = preview participant) are not suitable for analyses. It is therefore important when you are practicing to record the logins that are generated so that you can return to change the consent status.

Marking a Participant as Practice ("Test")

1. In a launched study, navigate to Administration
2. Click on Participant List
3. Click on the hyperlink next to the desired login
4. Change the Consent status from Yes to Test
5. Click Register Participant button at bottom of page to record change.
6. In data exports, sort to only include consent=1 participants

Helpful Resources

Help

Assessment Center includes a Help feature at the top right of each screen that can be accessed at any time. You can use this hyperlink to access an index of Assessment Center information. The organization of Help parallels that of Assessment Center. Help includes definitions, explanations of how to complete particular tasks, tips, and additional useful information. Help opens into a second window to allow the user's work not to be disturbed while seeking additional information.

Assessment Center User Manual

An extensive user manual with step-by-step instructions on utilizing all features of Assessment Center is available for download on the Assessment Center homepage (www.assessmentcenter.net). Click on the User Manuals hyperlink to open a PDF.

Assessment Center Online Video Tutorials

A series of video tutorials were created to review material covered in this training. You can access and view these by clicking on the Video Tutorial hyperlink on the left side of the www.assessmentcenter.net homepage.

NIH Toolbox e-Learning Modules

There are also e-learning Modules and NIH Toolbox training videos on the nihtoolbox.org website.

NIH Toolbox Training Manual

A training manual that helps you learn the correct administration of the NIH Toolbox is on the nihtoolbox.org website.

Accessing NIH Toolbox After Training

Complete the registration form on the nihtoolbox.org website to gain access to NIH Toolbox instruments.

Assessment Center Help Desk

Assessment Center has a help desk that can be accessed Mon-Fri 9am-5pm CST. Email help@assessmentcenter.net or call the help line at 877-283-0596.

Introduction to Computer and Special Equipment

Hardware and Software Setup

Before beginning:

Have your laptop and monitor ready. Laptops must have Windows 7, have 4 USB ports, and support a screen resolution of at least 1366 x 768. External monitors must measure 19" and support a screen resolution of 1440 x 900. An Adobe Flash player is required for many of the cognition instruments
The Internet Explorer browser that is open on the external monitor must be set to full screen

NIH Toolbox instruments have been optimized to run and are supported on Windows 7 and Internet Explorer 11

Have a multi plug power strip ready to accommodate the power cords and chargers.

Have the necessary Toolbox equipment close at hand.

Laptop and Monitor Setup for NIH Toolbox Cognition and Sensory Instruments:

The Cognition and Sensory measures are designed to be administered in dual-screen mode so the examiner controls start of test, skipping a test (when the participant is ineligible or unwilling to take a measure), stopping a test (if the participant refuses to continue), and in some cases, scoring. The laptop is used by the examiner and the external monitor is used by the participant.

*It is essential that you set up your laptop and monitors properly***.** If resolution on primary monitor is incorrect you will have difficulty administering the Toolbox.

Set up the monitor to the **left** of the laptop at slightly more than a 90-degree angle. Plug in the three laptop-to-monitor cables:

1. Laptop power cord;
2. External monitor power cord; and
3. Monitor VGA cable (the one provided with monitor). If vision measures are not given, 15-foot VGA cable required for administration of the Vision measures.

To set up dual screen display with the external monitor as primary, do the following <u>after the external monitor has been plugged in</u>:

- Right click on the desktop.
- Choose **Graphics** options.

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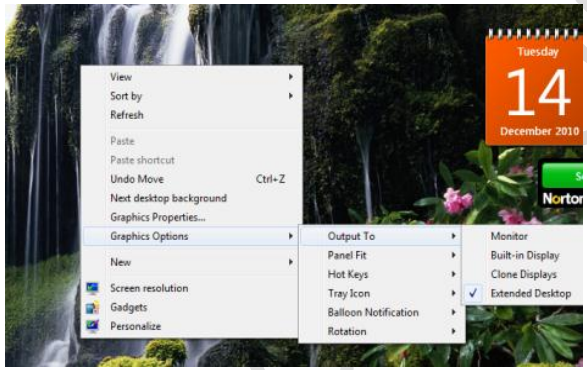
- Choose **Output To**.
- Hover over **Extend Desktop** and select **Monitor + Laptop** (external monitor is the primary display).

- The resolution for the monitor should be set to 1440 x 900. To set this, right click on the desktop and choose **Graphic Properties** or **Resolution**. Click the dropdown following **Resolution** to adjust it only if it is not set to 1440 x 900. You may need to repeat this process whenever the monitor is unplugged from the laptop.
- The resolution for the laptop should be set to 1366 x 768 or 1440 x 900.



Because the secondary window is implemented as a browser pop-up, you will need to **allow pop-ups** from the **Assessment Center/NIH Toolbox** web site before using the Toolbox.

During testing we recommend that automatic updates and virus scanning software be disabled, as these can disrupt the administration of the instruments.

Users should dedicate laptop(s) solely for NIH Toolbox usage. If other programs are installed on the laptop, device drivers can conflict with NIH Toolbox drivers and prevent instruments from functioning. **Laptop or Desktop Setup for NIH Toolbox Motor and Emotion Instruments:**

The Motor and Emotion instruments do not require a two-screen setup. They do, however, require a minimum resolution of 1366 x 768, Windows 7.0, and IE 8.0 to run properly.

Mice, Keyboard, and Speakers Setup for NIH Toolbox Cognition and Sensory Instruments:

Two mice are needed when giving Cognition or Sensory instruments: one for the examiner and one for the participant.

The keyboard is needed for the cognition processing speed and executive function instruments (Flanker, DCCS, and Pattern Comparison).

NIH Toolbox Training

If using external speakers or headphones (recommended), plug the connector from the speakers or headphones into the computer's headphone jack.

A note about touch-screen monitors or other input devices: Some studies prefer to use touch-screen monitors. Touch screens that employ a mouse driver emulation can be used. Please note that response time norms for the Flanker, DCCS, and Pattern Comparison tests were collected using the keyboard arrow keys, so using a touch screen for response will invalidate the norms for those instruments. We do not provide technical support for touch screen use.

Input devices such as trackballs that use mouse drivers are also supported. Toolbox instruments cannot be used with a button box or other serial devices that are designed for use with Windows applications, as Assessment Center is a browser-based .NET application.

USB Hub

You will need a hub only if you are giving instruments that require additional hardware or devices, such as Words-In-Noise, Hearing Threshold, Standing Balance, and Dynamic Visual Acuity, or if your laptop does not have at least 4 USB ports.

Plug the hub into one of the laptop's USB ports. Plug the mice used by participant and examiner, and the keyboard, into the hub's ports. The specialized Toolbox equipment should always plug directly into one of the laptop's USB ports.

Bluetooth

Setup for the NIH Toolbox Standing Balance Test:

The Standing Balance test uses an accelerometer to transmit sway data to the laptop using Bluetooth. The laptop must be able to receive this data using an internal Bluetooth 3.0 receiver (recommended) or an external Bluetooth receiver. The balance device comes with a power cord to recharge the internal batteries. It should be charged between examinations.

Installing the Bluetooth Receiver:

If the laptop does not have an internal Bluetooth 3.0 receiver, plug an external USB Bluetooth Receiver directly into one of the laptop USB ports (not the hub). You will need to install the Bluetooth receiver driver following manufacturer's instructions.

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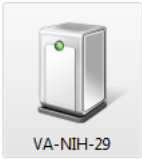
Pairing the Bluetooth Receiver for the Standing Balance Test:

Each Bluetooth receiver is paired with an individual laptop. Keep track of which device goes with which laptop; do not switch them. If you find yourself with a balance device that is not paired with your machine you, will need to repeat the pairing process.

To pair the NIH Toolbox Standing Balance Bluetooth receiver before administering the test:

- Make sure Bluetooth is enabled: Open **Control Panel** and choose **Devices and Printers**, or choose the Bluetooth icon from the shortcut menu. If you have installed a Bluetooth receiver, you should see an icon labeled as such.
- Turn on the new balance device and click **Add a device**.
- Click the **VA-NIH-99** icon to select the device and choose **Next** (each device will have a different number).



- The device will pair with the laptop and a message will ask for the pairing code. Enter **default.**
- The COM port assigned to the balance receiver is stored in the browser's local storage. If you delete your browser history you may have to set this up again.

IMPORTANT! Do not turn off the Bluetooth receiver or the accelerometer while you are collecting data, as this will cause data loss and may affect the COM port.

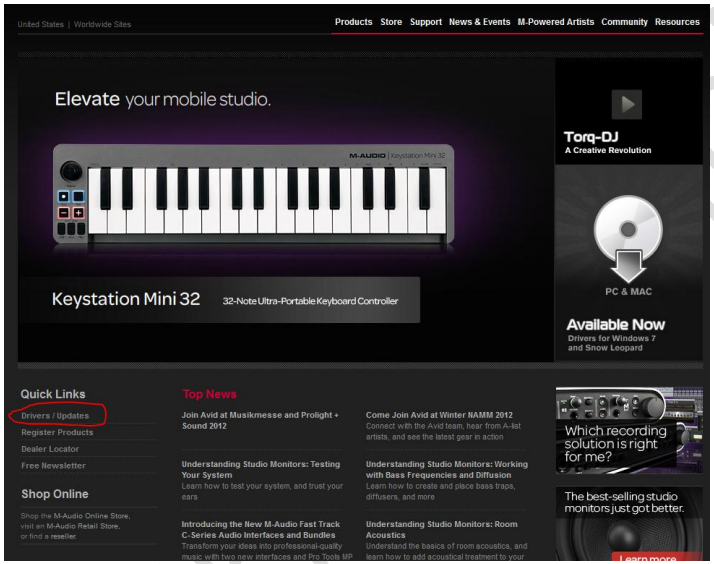
Soundcard and Headphone setup for the NIH Toolbox Words-in-Noise and Hearing Threshold Tests:

The hearing tests require an external soundcard and headphones. Before connecting the hardware for the first time, you **must** install the soundcard driver from the m-audio website (www.m-audio.com) .If you plug in the hardware before installing the driver, the operating system will choose a generic driver and the Toolbox instruments will not work. Take care to setup your hearing equipment properly. Failure to do so will cause the instruments not to work or the results to be invalid.

NIH Toolbox Training

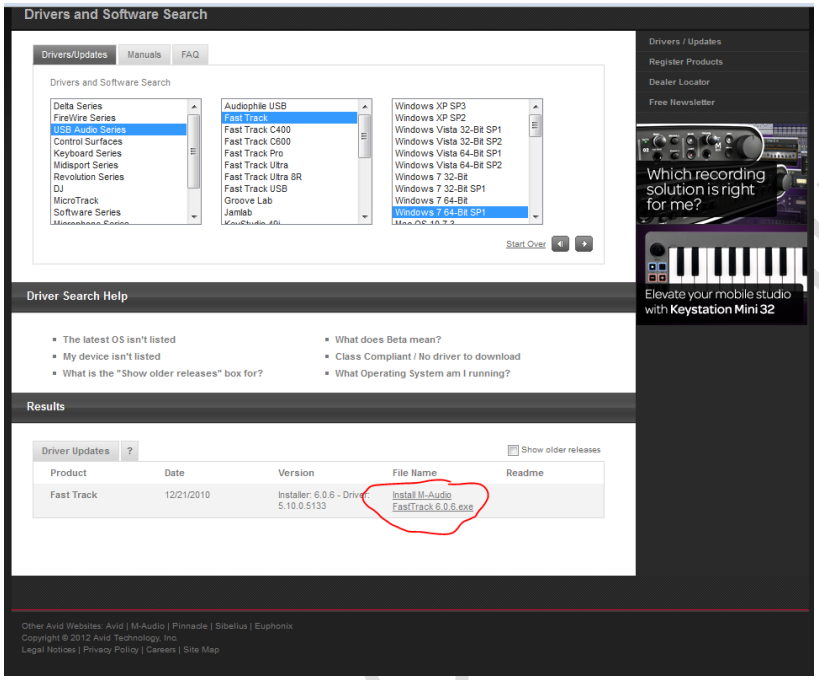
Installing the Soundcard Driver:

- Go to **www.m-audio.com**.
- Click **Drivers/Updates** (circled in red) under **Quick Links**.



- Select **USB Audio Series**, **Fast Track**, and **Windows 7.0** in the **Drivers and Software Search** boxes.
- Locate the **File Name** (circled in red) under **Results**. Click the link to install the driver.

NIH Toolbox Training



- Scroll down to locate the link for the driver (circled in red).

NIH Toolbox Training

- Click **Save File** when prompted.
- Open the file and follow the instructions to install the driver.

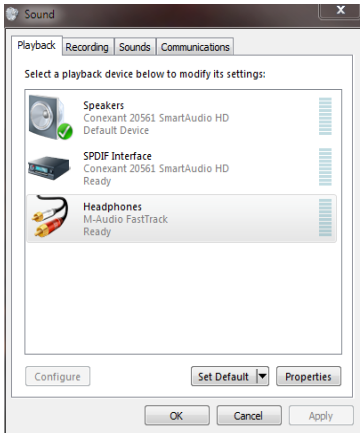
Plugging in the Soundcard and Headphones:

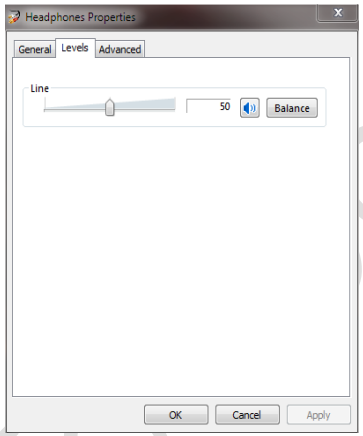
Once the sound card drivers are installed, you may plug in the soundcard and headphones and set the dials.

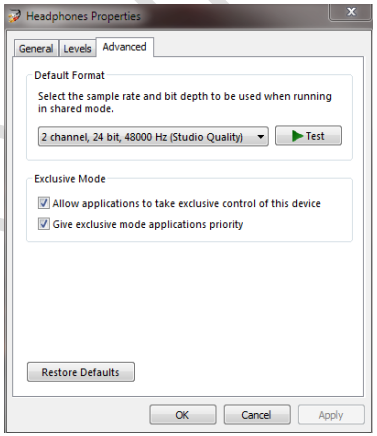
- Plug the mini end into the soundcard (box) and then connect the USB cable directly to a USB port on the laptop (not a port on the USB hub if one is used). If there is a USB port in the back of the laptop, this is an excellent port for the soundcard. It is important to *always* plug the headphones into *the same* USB port each time you use them. If you do not, you will lose the settings and need to reconfigure the device.
- Connect the headphones to the large stereo headphone jack on the soundcard (not the guitar jack). Make sure the connector is fully seated.
- Verify that front button and back switch are in **OFF** position.

- Set the **Mic Gain** dial to nine o'clock; set the **Guitar Gain** dial to seven o'clock; set the **Output** dial to three o'clock.

Setup the External Sound Card:







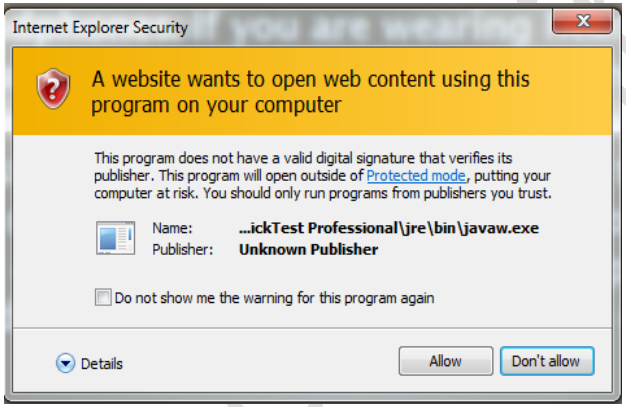
- Open the **Control Panel** and choose **Sound.**
- Double click on **M-Audio Fast Track**.
- On the **General** tab, enter **Headphones** for the device name.
- Select the **Levels** tab and set the sound level to **50**.
- Select the **Advanced** tab and set **Default Format** to **2 channel, 24 bit 48000Hz (Studio Quality).**
- Click **OK** to save.
- Close the browser. If this does not work, reopen browser and try again.

NHTC Training

Install the Java Applet for the NIH Toolbox Hearing Threshold and Words-In-Noise Tests:

Install the Java Applet for the NIH Toolbox Hearing Threshold and Words-In-Noise Tests:

The first time you launch the Hearing Threshold test you will be asked to install the Java Applet that controls the sound and logic of the test. This applet is required for the test to work. You may see a dialog box similar to the following. You should select the Allow button to install the applet. If present, you should check the box 'Always trust content from this publisher.



Calibrating the headphones for the NIH Toolbox Hearing Threshold Test:

Each set of headphones must be calibrated to an individual soundcard. This must be done before administering the NIH Toolbox Hearing Threshold Test *and* once every six months to a year thereafter. Failure to calibrate the equipment will produce invalid results.

The calibration routine is found on the NIH Toolbox website. You will need an extremely quiet room and the following equipment (shown below). It may be helpful to place the headphones and sound level meter on a pillow or piece of foam.

NIH Toolbox Training

- Download the calibration program zip file from the NIH Toolbox website to your desktop.
- Unzip the calibration zip file to the desktop.
- Locate the **run_cal.bat** file, right click, and create a shortcut icon. Move the shortcut to the desktop.
- Start with the configured soundcard plugged into the laptop. If it is not plugged in and functioning, you will not be able to run the calibration program. Make sure the **Direct Monitor** (white) button is in the **OFF** position.
- Double-click the shortcut to execute the calibration program.
- Follow the instructions contained within the program until you have successfully calibrated the equipment.
- The calibration program will write values to the **config.props** file in the Calibration folder. You will need to copy this file to the directory **C:\Program Files\NIH Toolbox Hearing Threshold\Toolbox Hearing ActiveX**, which is created the first time you run the Hearing Threshold test.
- Launch the NIH Toolbox Hearing Threshold Test. You will be asked to install the required ActiveX component for the test. Allow the component to be installed.
- Copy the **config.props** file to the **C:\Program Files\NIH Toolbox Hearing Threshold\Toolbox Hearing ActiveX** directory. The existing file will be overwritten.

NIH Toolbox Training

Equipment Setup for the NIH Toolbox Dynamic Visual Acuity Test:

The NIH Dynamic Visual Acuity Test uses a rate sensor attached to headgear connected to the computer with a supplied mini USB-to-USB cable. Make sure the laptop is turned on with Windows running *before* plugging in this equipment. If you plug this equipment in first and then turn on the laptop, you may receive a blue screen of death (BSOD).

- Plug the USB end directly into a USB port on the laptop (preferably on the right side), not a USB port on the external hub.
- Connect the DVA headgear to the other end of the cable via the supplied mini-USB plug.
- The DVA device should begin working once it is plugged in and the XR21V device driver is installed.
- If the DVA device stops working, it is often due to a disruption in the communication between the USB/COM port and the device. Reasons this may happen include allowing the PC to go into hibernate mode during the test or letting the test time out. If this happens:
  - unplug the cable, plug it back into the same USB port, and wait approximately10 seconds for COM port to be recognized (see lower right for message).
  - If necessary, restart the test by closing out of both the browser and the DVA application. If it is still a problem, reboot the laptop.

NIH Toolbox Training

Frequently Asked Questions (FAQs)

Please consult this list before calling Tech Support

The following steps should solve most low-level problems:

1) If external monitor displays **No Signal Detected** or nothing at all, do the following:
   - Right click on the desktop.
   - Choose **Output To**.
   - Hover over **Extend Desktop**.
   - Select **Monitor + Laptop**.
   - Ensure the laptop on which the Toolbox is given is set up with the following settings:
     - Windows 7: hibernate **OFF** if using Toolbox equipment; Windows updates **OFF** during test administration;
     - IE 9: on-click sound turned **OFF**, compatibility mode **ON**;
     - Virus scan software: automatic scans turned **OFF** so as not to disrupt the testing session.
2) If your problem is not resolved after trying the above steps, please consult the list of frequently asked questions below.

General Hardware and Software FAQs

Nothing is displayed on the monitor or the monitor is displaying weird colors:

- Check the VGA cable and ensure it is seated firmly into the VGA port on the left side of the laptop. Then, follow the steps immediately below to setup two screens.

You see only one screen on a two-screen instrument:

- Move the monitor to the **left side of the laptop.**

OR, if that does not correct it:

- Right click on the desktop.
- Choose **Graphic Options**.
- Choose **Output To**.

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- Hover over **Extend Desktop**.
- Select **Monitor + Laptop**.

OR, if that does not correct it:

- Make sure that pop-ups are enabled for the Toolbox website: Click **Tools > Popup blocker** in IE.

OR, if that does not correct it:

- Hover over the Internet Explorer icon in the system tray at the bottom of the screen. If two windows are there, click on the window you could not see.

OR if that does not correct it:

- Click the participant screen and press **CTRL+R** to refresh.

On the examiner (laptop) screen…

I can't see the Start Test button:

- Verify that your screen resolution is set to 1366 x 768 or 1440 x 900;

OR

- Grab the title bar of the examiner screen and move it up and down a bit on the screen to see if it adjusts itself;

OR

- Grab the lower boundary of the screen and expand the window size.

I can't see the title bar:

This can happen if your laptop resolution is not set to 1366 x 768. You should not have to move the window, so you can simply leave it alone until you are finished testing your participant.

The examiner screen doesn't open automatically at the beginning of a test (or during a test):

- First, hover over the **IE** icon in the system tray on the external monitor to see if two instances open. If yes, select the examiner window. It should open on the laptop and stay open. If it opens on the participant screen, click on the title bar and drag the window from the monitor screen to the laptop screen. This should correct the problem. If necessary, close the browser and then reopen it.
- When you hover over the IE icon in the system tray, if only one instance appears, click the open browser to select it and press **F5**. Select refresh on the menu bar or click **CTRL+R** to refresh the screens.

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The shading on the examiner screen is uneven:

- From the **Tools** menu on **IE**, make sure **Compatibility mode** is selected.

When attempting to log in a participant…

I get an error saying the PIN and Password combination is wrong:

- Log in as yourself.
- Click **Registration Details** on the **Administration** tab in **Assessment Center**.
- Verify that the password listed is the one you believe you entered.

I get an error stating no assessment is scheduled for this participant:

- Log in as yourself.
- Click **Registration Details** on the **Administration** tab in **Assessment Center**.
- Select **View Schedule Details**.
- Verify the schedule start and end date listed includes today's date. If not, adjust the schedule:
  - Edit the **End Date** for the **Baseline** or **Retest** event to a date beyond the current date.
  - Click the **pencil** icon to the left to save. The line turns green to indicate the testing window is now open.
  - Close the window, log out, and re-enter the participant PIN.

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FAQs for Individual Instruments
(in alphabetical order)

Emotion Domain

A participant with limited vision wants to increase the font size for survey-type instruments:

Use the **Zoom** feature of IE to make the text larger. Note that the participant will have to scroll down to see the navigation buttons.

- With the focus on the participant screen, hold down the Ctrl key and press the plus (+) key (**Ctrl+**) one or more times until you reach the desired size.
- To reduce the text size, **–**follow the dame procedure, but use the minus (-) key (**Ctrl-**).

Hearing Threshold Test (Sensory domain)

I am trying to skip HTT but it is not working:

Once the HTT is started it will take several seconds to skip it. Be patient and wait for it to work. **DO NOT** click **Skip Test** again or you may end up skipping the next test as well.

Hearing Threshold Test buttons don't work or no sound is heard for the instructions:

- Verify sound card is plugged directly into the *correct* USB port of the laptop.
- Verify that headphones are securely connected to headphone (*not guitar*) jack of soundcard and that front button and back switch are in **OFF** position.

If that does not work, check the external soundcard settings as described in the set-up section above.

List Sorting Working Memory (Cognition domain)

Scroll bars are present on the pictures on list sorting:

From the **Menu** or **Command** bar of IE, select **Zoom** and make sure it is set to **100%**.

Pattern Comparison Processing Speed (Cognition domain)

I stopped the test before it was completed, and when I log back in it takes me to the next test:

Pattern comparison is a timed test. Once you start it, you must complete it. You cannot resume.

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Picture Sequence Memory (Cognition Domain)

I can't get past Arranging Flowers. The NEXT button is inactive.

You must follow the **training sequence steps** in the manual or on screen to enable the button:

- Move both pictures from the mat to the boxes.
- Move both pictures back to the mat.
- Move one or more pictures from one box to the other box.

Please refer to the **Picture Sequence Memory** section of the manual and follow the sequence as described.

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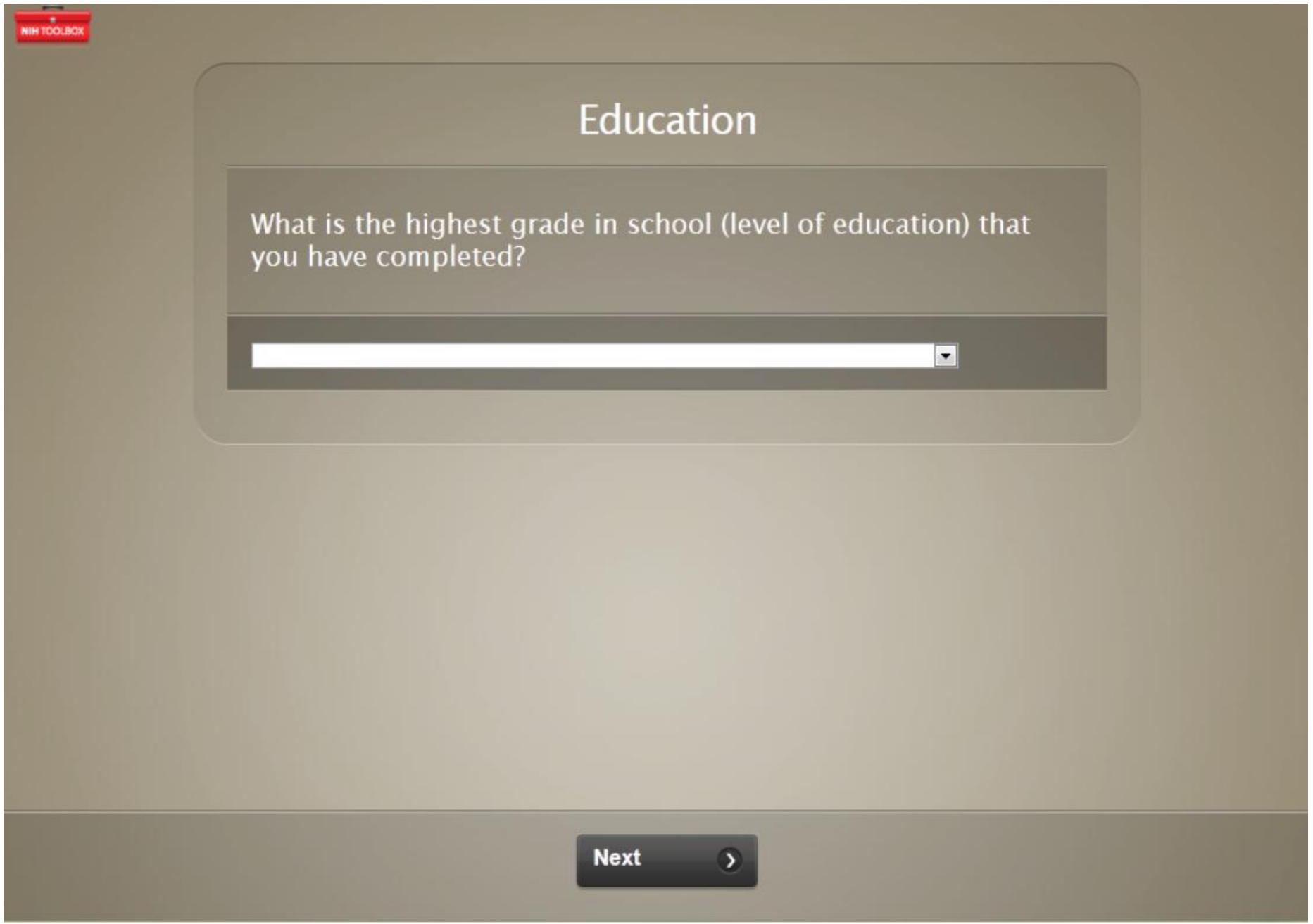
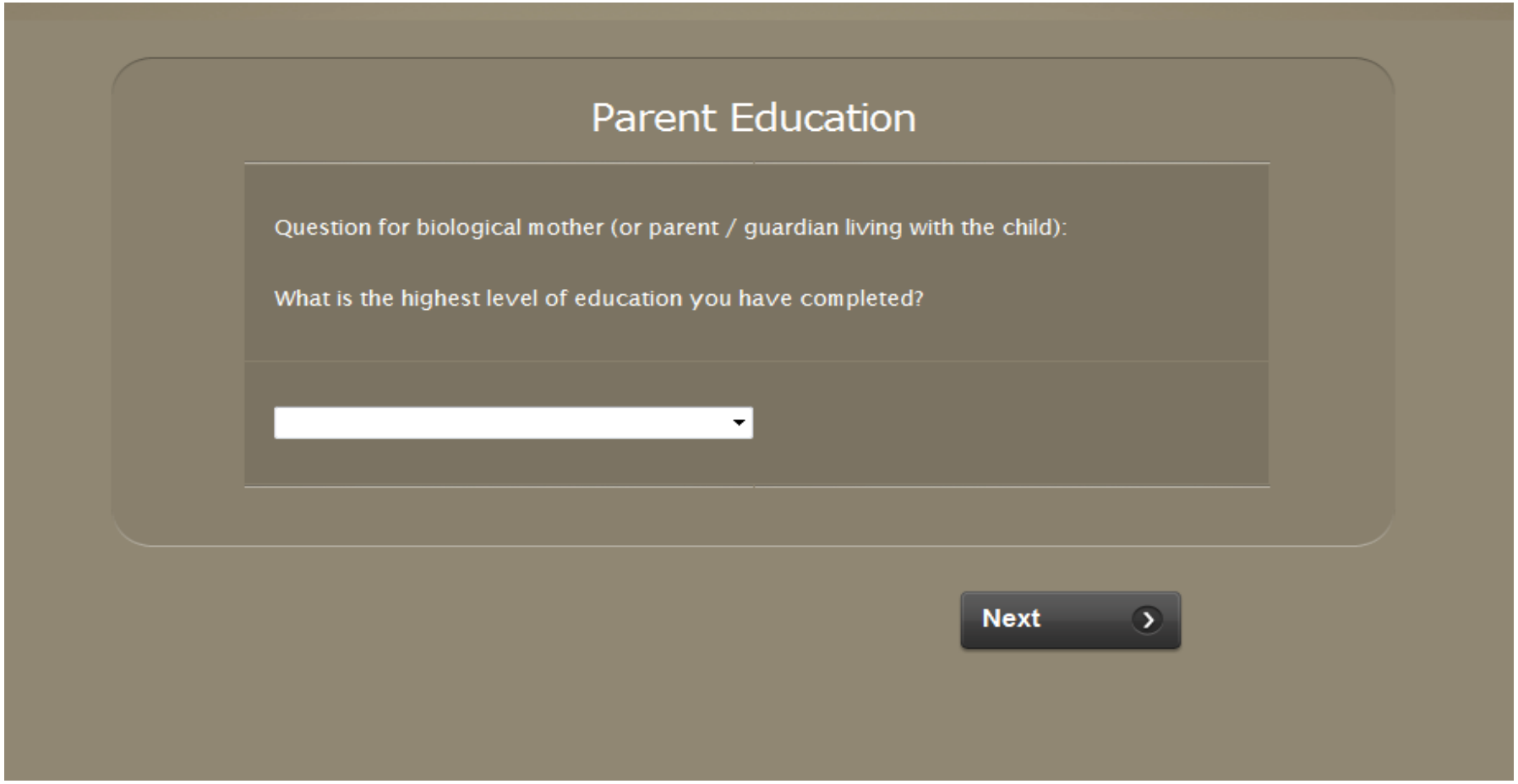

NIH TOOLBOX
Education
What is the highest grade in school (level of education) that you have completed?
Next


Parent Education
Question for biological mother (or parent / guardian living with the child):
What is the highest level of education you have completed?
Next

Determining Handedness Instructions

Materials:
Ball
Pencil/pen
Paper

The examiner should determine handedness by asking the participant or the parent/guardian the following question: **Are you… or Is your child right- or left- handed?**

☐ Right ☐ Left ☐ Unsure

If the participant or parent/guardian is unsure or responds that different hands are used for different activities, ask the following three questions:

1) **Which hand do you (does your child) use to pick up and throw a ball?** *Demonstrate with a ball if necessary.*

   ☐ Right ☐ Left

2) **Which hand do you (does your child) use to write or draw?** *Demonstrate with a pencil or pen if necessary.*

   ☐ Right ☐ Left

3) **Which foot do you (does your child) use to kick a ball?** *Demonstrate with a ball if necessary.*

   ☐ Right ☐ Left

When the participant is asked to use the dominant hand for a task, he or she should use the hand/foot that he/she uses for the majority of the tasks above. The examiner should record handedness on the motor data sheet and the data screens when they appear.

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NIH Toolbox Administration

Administration Instructions

Most of the instructions are on the examiner screen.

1. Introduce task, say: **Let's look at some pictures. You'll hear a word and see four pictures on the screen. Click on the picture that means the same as the word that was said. Some words will be easy and some will be harder. If you are not sure of an answer, just make your best guess. If you need to hear a word again, click on the button that has a picture of an *EAR*, also called the *PLAY AGAIN* button. After you click on a picture, you will hear a new word and see more pictures.**
   If you are not sure of an answer, just make your best guess. If you make a mistake and want to change your last answer, click on the HAND, also called the GO BACK button. The pictures you just saw will reappear and you will hear the word again. Click on your choice, and then more words and pictures will appear. Tell me when you are ready to start. Click **NEXT** button.
2. Two practice items are automatically administered by the computer. Allow the child up to three chances to answer this practice item correctly. After three unsuccessful attempts, click the correct picture on the child's screen and say: **This is a banana** or **This is a spoon.**
3. Review the task with the child, saying: **Remember, you will hear a voice say a word and then you will see four pictures. One of the pictures will show what the word means. Click on that picture and you will hear a new word and see four more pictures. Again, click on the picture that shows what the word means. If you don't know, make your best guess. Any questions?** Answer the questions.
4. Say: **Now, let's try some more. When you are ready, click on the button with the HAND to continue.**

   Warning: The hand itself is not live; the child must click on the area around the word. The examiner may help if needed.

Remember: If a participant has difficulty using the mouse, he/she may point and the examiner can operate the mouse. If the participant says that he/she does not understand the word after several repetitions, the examiner may say the word **one more time**.

Administration Instructions

Most of the instructions are on the examiner screen.

1. Introduce task, say: **You are going to be asked the meaning of some words. For each item, you will hear a word and see four pictures on the screen. Click on the picture that you think best matches the meaning of the word that was said. If you are not sure, make your best guess. If you need to hear the word again, click on the button that has a picture of an *EAR*, also called the *PLAY AGAIN* button. After you make your choice and click on a picture, the computer will automatically go to the next word and pictures. You will keep hearing words and clicking on pictures until you are done.**

   If you want to change your choice, click on the button with the *HAND* that says *GO BACK* and change your choice. Each time you make a choice, the computer automatically gives you a new word and a new set of pictures. Remember, if you are not sure of an answer, make your best guess. Tell me when you are ready to start. Click the **NEXT** button.

2. Two practice items are automatically administered by the computer. Allow the child up to three chances to answer this practice item correctly. After three unsuccessful attempts, click the correct picture on the child's screen and say: **This is a banana** or **This is a spoon.**
3. Review the task with the participant, saying: **Remember, you will hear a word and then you will see four pictures. One of the pictures will show what the word means. Click on that picture; then you will hear another word and see four more pictures. Again, click on the picture that shows what the word means. If you don't know an answer, make your best guess. Any questions?** Answer the questions.
4. Say: **Now, we're going to do some more. Some of the words will be easier and some will be more difficult. Just try your best on each question. When you're ready, click the NEXT button to start.**

Remember: If a participant has difficulty using the mouse, he/she may point and the examiner can operate the mouse. If the participant says that he/she does not understand the word after several repetitions, the examiner may say the word **one more time**.

NIH Toolbox Administration

Administration Instructions

Everything said to the child is on the screen.

	Child (C) screen written content	Examiner (E) Action
PRACTICE Introduction	Here is a Fish! This is the TAIL ->[fish] <- This is the MOUTH. The fish is pointing this way, the same way the fish is swimming.	Points to child's screen, then click NEXT on E's screen.
	Here the MIDDLE fish is circled. Can you point to the MIDDLE fish?	Child points; E clicks NEXT on E's screen.
	Where is the MIDDLE fish here?	Child points; E clicks NEXT on E's screen.
	Look at all the fish!!! The fish in the MIDDLE is hungry.	Clicks NEXT.
	To feed the MIDDLE fish, choose the button that matches the way the MIDDLE fish is pointing.	Demonstrates using index finger with keyboard.
	If the MIDDLE fish is pointing this way, choose this button.	Demonstrates use of keyboard.
	If the MIDDLE fish is pointing this way, choose that button.	Demonstrates use of keyboard.
	Sometimes all the fish face the same way. Sometimes the MIDDLE fish faces a different way from his friends, like this: [picture of incongruent fish]. You should always choose the button that matches the way the MIDDLE fish is pointing. You will hear and see the word MIDDLE to remind you.	Points, then chooses button.
	Here the MIDDLE fish is pointing this way, so I'll choose this button.	Points, then chooses button.
	Here the MIDDLE fish is pointing this way, so I'll choose this button.	Points, then chooses button.
Transition to practice items	Now you try. Keep your eyes on the star. Answer as fast as you can without making mistakes. If you make a mistake, just keep going.	Clicks NEXT on E's screen.
	4 practice items	
More practice, if needed	Let's practice some more. If the MIDDLE fish is pointing this way, choose this button.	Points, then chooses button.
	If the MIDDLE fish is pointing this way, choose that button.	Points, then chooses button.
Transition to more practice items	Now you try. Keep your eyes on the star. Answer as fast as you can without making mistakes. If you make a mistake, just keep going.	Clicks NEXT on E's screen.

Not to be Administration

	Child (C) screen written content	Examiner (E) Action
	4 practice items	
More practice, if needed.	Let's practice some more. If the MIDDLE fish is pointing this way, choose this button.	Points, then chooses button.
	If the MIDDLE fish is pointing this way, choose that button.	Points, then chooses button.
Transition to more practice items	Now you try. Keep your eyes on the star. Answer as fast as you can without making mistakes. If you make a mistake, just keep going.	Clicks NEXT on E's screen.
	4 practice items	
Test Items transition	Now you're ready to do this without me. Keep your eyes on the star. Answer as fast as you can without making mistakes. If you make a mistake, just keep going.	Clicks NEXT on E's screen.
Test items	20 test items (fish)	
More test items if 90% success on fish	Now you will do the same thing, but you will see arrows instead of fish. Keep your eyes on the star. Answer as fast as you can without making mistakes. If you make a mistake, just keep going.	Clicks NEXT on E's screen.
	20 test items (arrows)	

NIH Toolbox Administration

Administration Instructions

Everything said to the participant is on the screen.

	Participant(P) screen written content	Examiner (E) Action
PRACTICE Introduction	In this task, you will see a row of arrows. You should choose the button that matches the way the MIDDLE arrow is pointing.	Points to left arrow on the P's screen and demonstrates use of index finger to choose the correct arrow.
	If the MIDDLE arrow is pointing this way, choose this button.	Demonstrates use of keyboard.
	If the MIDDLE arrow is pointing that way, choose that button.	Demonstrates use of keyboard.
	Sometimes all the arrows point the same way. Sometimes the middle arrow faces or points a different way, like this [picture of incongruent arrows]. You should always choose the button that matches the way the MIDDLE arrow is pointing. You will see the word MIDDLE to remind you.	Demonstrates use of keyboard.
Transition to practice items	Now you try. Keep your eyes on the star. Answer as fast as you can without making mistakes. If you make a mistake, just keep going.	Clicks NEXT on E's screen.
	4 practice items	
More practice, if needed	Let's practice some more. If the MIDDLE arrow is pointing this way, choose this button.	Demonstrates use of keyboard.
	If the MIDDLE arrow is pointing this way, choose that button.	Demonstrates use of keyboard.
Transition to more practice items	Now you try. Keep your eyes on the star. Answer as fast as you can without making mistakes. If you make a mistake, just keep going.	Clicks NEXT on E's screen.
	4 practice items	
More practice, if needed	Let's practice some more. If the MIDDLE arrow is pointing this way, choose this button.	Demonstrates use of keyboard.
	If the MIDDLE arrow is pointing this way, choose that button.	Demonstrates use of keyboard.

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Transition to more practice items	Now you try. Keep your eyes on the star. Answer as fast as you can without making mistakes. If you make a mistake, just keep going.	Clicks NEXT on E's screen.
	4 practice items	
Test Items Introduction	Now you're ready to do this without me. Keep your eyes on the star. Answer as fast as you can without making mistakes. If you make a mistake, just keep going.	Clicks NEXT on E's screen.
Test items	20 items (arrows)	

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Administration Instructions

Most of the instructions are on the examiner screen.

1-List Condition

REVIEW: The 1-List practice items all have the same format of questions (although the presentations vary). First the examiner asks for the smallest animal and if correct, the examiner asks for the next biggest animal. If the child answers incorrectly on any particular question, there is a verbal explanation and/or a replaying of the item on the screen and repeating the question. If after two opportunities, the child continues to answer incorrectly, the test will be discontinued and no more items will be presented. The first practice item is detailed below and the others are outlined.

Introduction

Say: **Now, we're going to look at things that are different sizes. Some of the things are small and some things are big** (use hand gestures). **Your job is to tell me what is smallest and what is biggest. Let's start by looking at some pictures of animals together.** Click **START TEST.**

1-List Practice Item 1:

Continue: Click ***PLAY***; say: **This is a dog** (point to dog on screen) **and this is a horse** (point to horse)**.**

Question A: Say: **Tell me which animal is the smaller animal.** If child does not respond, say: **Which is smaller, the DOG or the HORSE?**

Correct Response: If child says DOG, say: **Good job.** Click #1 on examiner's screen; then click **NEXT.** Computer automatically goes to next question.

Incorrect Response: If child does not say DOG, say: **Let's try that again. See, the DOG is smaller than the HORSE** (point out relative sizes). **Now, tell me the smaller animal.** If child says DOG, say: **Good job.** Click #2; then click **NEXT.** Computer automatically goes to next question.

If child does not know smaller animal after 2 trials, click #3; then click **NEXT. Test will be discontinued**.

Question B: Click **PLAY**; say: **Now, tell me the bigger animal.**

Correct Response: If child says HORSE, say: **Good job.** Click #1; then click **NEXT**. Computer automatically goes to next question.

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Incorrect Response: If child does not say HORSE, say: **Let's try that again. See, the HORSE is bigger than the DOG** (point out relative sizes). **Now, tell me the bigger animal.** If child says HORSE, say: **Good Job.** Click #2; then click **NEXT.** Computer automatically goes to next question.

If child does not know bigger animal after 2 trials, click #3; then click **NEXT. Test will be discontinued**.

1-List Practice Item 2:

Say: **Now we are going to do some more.** Click **PLAY;** *say*: **This is a RABBIT** (point to RABBIT); **this is a SHEEP** (point); **and this is an ELEPHANT** (point).

Question A: Click **PLAY**; say: **Tell me the smallest animal.**

Question B: Click **PLAY**; say: **Now tell me the NEXT biggest animal.**

Question C: Click **PLAY**; say: **Now tell me the biggest animal.**

1-List Practice Item 3:

Say: **Now we are going to do some more. This time, you're only going to see one picture at a time. You have to remember what you see and tell me the smaller and then the bigger animal. Let's start by looking together.** Click **PLAY**.

Question A: When screen is blank, say: **Now, tell me the smaller animal.**

Question B: Click **PLAY**; when screen is blank, say: **Now, tell me the bigger animal.**

1-List Practice Item 4:

Say: **Now we are going to do some more. Are you ready?** Click **PLAY.**

Question A: When screen is blank, say: **Tell me the smallest animal**.

Question B: Click **PLAY**; when screen is blank, say: **Now tell me the NEXT biggest animal.**

Question C: Click **PLAY**; when screen is blank, say: **Now tell me the biggest animal.**

1-List Test Items:

Say: **Let's look at some more pictures. Remember, after you see the pictures you will see a blank screen. Once you see this blank screen, I want you to tell me what you just saw in size order from smallest to biggest.**

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Continue: **It is important to pay attention to the size of the object on the screen when putting things in size order from smallest to biggest.** Click **NEXT.**

Click **PLAY;** say (for the first item and then only as necessary)**: Once you see the blank screen, tell me what you just saw in size order from smallest to largest.** Mark the item *CORRECT* (Yes) or *INCORRECT* (No) based on child's response.

2-List Condition

REVIEW: The 2-List practice items all have the same format of questions (although the presentations vary). First the examiner asks for the food from smallest to largest and then for the animals from smallest to largest. If the answer is correct, the examiner moves on to the next question. If the child continues to answer incorrectly, the test will be discontinued and no more items will be presented. The first practice item is detailed below and the others are outlined.

Introduction

Say: **We're going to look at more pictures. This time, you will see both food and animals in a set of pictures. I'd like you to tell me the food first, and then the animals. I'd like you to tell me the food first, and then the animals, in size order from smallest to biggest. It is important to pay attention to the size of the object on the screen when putting things in size order from smallest to biggest. Let's start by looking at some more pictures together.** Click **NEXT.**

2-List Practice Item 1:

Click **PLAY;** say: **This is a BEAR** (point) **and this is a BANANA** (point).

Question A: Say: **Tell me which one is a food.**

Correct Response: If child says BANANA, say: **Good job.** Click #1; then click **NEXT**. Computer automatically goes to next question.

Incorrect Response: If child does not say BANANA, say: **Let's try that again. The BEAR is an animal; the BANANA is a food. OK, now you tell me the food**. If child answers BANANA, say: **Good job.** Click #2; then click **NEXT.** Computer automatically goes to next question.

If child does not know food after 2 trials, click #3; then click **NEXT. Test will be discontinued**.

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Question B: Click **PLAY;** *say:* **Now tell me the animal.**

Correct Response: If child says BEAR, say: **Good job.** Click #1; then click **NEXT**. Computer automatically goes to next question.

Incorrect Response: If child does not say BEAR, say: **Let's try that again. The BANANA is a food; the BEAR is an animal. OK, tell me the animal.** If child answers BEAR, say: **Good job.** Click #2; then click **NEXT**. Computer automatically goes to next question.

If child does not know animal after 2 trials, click #3; then click **NEXT. Test will be discontinued.**

2-List Practice Item 2:

Say: **Now we are going to do some more.** Click **PLAY;** say: **This is a PINEAPPLE** (point); **this is a FROG** (point); **and this is a TIGER** (point).

Question A: Click **PLAY**; say: **Tell me the food.**

Question B: Click **PLAY**; say: **Tell me the smaller animal.**

Question C: Click **PLAY**; say: **Tell me the bigger animal.**

2-List Practice Item 3:

Say: **Now we are going to do some more. This time, we're only going to see one picture at a time. You are going to have to remember what you saw AND tell me the food first, then the animal. Let's start by looking together**. Click **PLAY.**

Question A: When screen is blank, say: **Tell me the food.**

Question B: Click **PLAY**; when screen is blank, say: **Now tell me the animal.**

Question C, after child *correctly* identifies the food and the animal separately, click **PLAY**. When screen is blank, say: **Now, tell me the food, then the animal.**

2-List Practice Item 4:

Say: **Now we are going to do some more. Are you ready?** Click **PLAY.**

Question A: When screen is blank, say: **Tell me the food.**

Question B: Click **PLAY**; when screen is blank, say: **Now tell me the smaller animal.**

Question C: Click **PLAY**; when screen is blank, say: **Now tell me the bigger animal.**

Question D: Click **PLAY**; when screen is blank, say: **Now tell me the food first and then the animals in size order.**

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2-List Test Items

Say (for the first item and then only as necessary)**: Let's look at some more pictures. Remember, after you see the pictures, you will see a blank screen. Once you see this blank screen, tell me the foods first in size order from smallest to biggest, then the animals, in size order from smallest to biggest.** Click **PLAY;** mark item *CORRECT* (Yes) or *INCORRECT* (No) based on the child's response.

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Administration Instructions

Most of the instructions are on the examiner screen.

1-List Condition

REVIEW: The 1-List practice items all have the same format of questions. First the examiner asks for the names of the pictures in size order from smallest to largest. If the participant answers incorrectly, there are two more opportunities to get a correct answer. The first comes after a verbal explanation and a repeat of the question; the second comes after replaying the item on the screen and repeating the question. If after three opportunities, the participant continues to answer incorrectly, the test will be discontinued and no more items will be presented. Both practice items are detailed below.

Introduction

Say: **I'm going to show you some pictures one at a time on the screen. After each set of pictures, you will see a blank screen. When you see the blank screen, I want you to tell me the names of the pictures in size order from smallest to biggest. For example, if I show you a motorcycle, a bus, and a car, you would say: motorcycle, car, bus. Do you have any questions? Let's practice.** Click **START TEST**.

1-List Practice Item 1:

Trial 1: Click **PLAY**; when screen is blank, say: **Tell me the animals in size order.**

Correct Response: If participant says DOG, HORSE, say: **That's right.** Click #1; then click **NEXT**. Computer automatically goes to next item.

Incorrect Response: If participant does not say DOG, HORSE, say: **Let's try that again.**

Trial 2: say: **You saw a DOG and a HORSE; the DOG is smaller than the HORSE. Tell me the animals in size order.** If participant says DOG, HORSE, say: **That's right.** Click #2; then click **NEXT**. Computer automatically goes to next item.

If participant does not say DOG, HORSE, say: **Let's try that one more time.**

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Trial 3: Click **PLAY** again; when screen is blank, say: **You saw a DOG and a HORSE; the DOG is smaller than the HORSE. Tell me the animals in size order. Now you tell me the smaller animal** (wait for response)**. Now tell me the bigger animal.** If participant says DOG, HORSE, say: **That's right.** Click #3; then click **NEXT**. Computer automatically goes to next item.

If participant answers one or both parts of the question *incorrectly* after 3 trials, click #4; then click **NEXT**. **Test will be discontinued.**

1-List Practice Item 2:

Say: **Now we are going to do some more. Are you ready?**

Trial 1: Click **PLAY**; when screen is blank, say: **Tell me the animals in size order, starting with the smallest animal.**

Correct Response: If participant says RABBIT, SHEEP, ELEPHANT, say: **That's right.** Click #1; then click **NEXT**. Computer automatically goes to next item.

Incorrect Response: If participant does not say RABBIT, SHEEP, ELEPHANT, say: **Let's try that again.**

Trial 2: say: **You saw a RABBIT, SHEEP and ELEPHANT; the RABBIT is smaller than the SHEEP and the SHEEP is smaller than the ELEPHANT. The RABBIT is the smallest animal, the SHEEP is the next biggest animal, and the ELEPHANT is the biggest animal. Now, tell me the animals in size order, starting with the smallest animal.** If participant says RABBIT, SHEEP, ELEPHANT, say: **That's right.** Click #2; then click **NEXT**. Computer automatically goes to next item.

If participant does not say RABBIT, SHEEP, ELEPHANT, say: **Let's try that once more.**

Trial 3: Click **PLAY** again; when screen is blank, say: **You saw a RABBIT, SHEEP and ELEPHANT; the RABBIT is smaller than the SHEEP and the SHEEP is smaller than the ELEPHANT. The RABBIT is the smallest animal, the SHEEP is the next biggest animal, and the ELEPHANT is the biggest animal. Now, tell me the animals in size order, starting with the smallest animal.** If participant says RABBIT, SHEEP, ELEPHANT, say: **That's right.** Click #3; then click **NEXT**. Computer automatically goes to next item.

If participant answers any part of the question *incorrectly* after 3 trials, click #4; then click **NEXT**. **Test will be discontinued.**

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1-List Test Items:

Say: **Let's look at some more pictures. Remember, after you see the pictures you will see a blank screen. Once you see this blank screen, I want you to tell me what you just saw in size order from smallest to biggest. It is important to pay attention to the size of the object on the screen when putting things in size order from smallest to biggest.** Click **NEXT**.

Click **PLAY**; say (for the first item and then only as necessary)**: Once you see the blank screen, tell me what you just saw in size order from smallest to largest.** Mark the item *CORRECT* (Yes) or *INCORRECT* (No) based on the participant's response.

2-List Condition

REVIEW: The 2-List practice items have the same format. First the examiner asks for the food from smallest to largest and then for the animals from smallest to largest. If the answer is correct, the examiner moves on to the next question. If the participant answers incorrectly, there are two more opportunities to get a correct answer. The first comes after a verbal explanation and a repeat of the question; the second comes after replaying the item on the screen and repeating the question. If after a total of three opportunities, the participant continues to answer incorrectly, the test will be discontinued and no more items will be presented. The practice items are detailed below.

Introduction

Say: **We're going to look at more pictures. This time, you will see both food and animals in a set of pictures. I'd like you to tell me the food first, and then the animals, in size order from smallest to biggest. It is important to pay attention to the size of the object on the screen when putting things in size order from smallest to biggest. Let's start by looking at some more pictures together.** Click **NEXT**.

2-List Practice Item 1:

Trial 1: Click **PLAY**; when screen is blank, say: **Tell me the food, then the animal.**

Correct Response: If participant says BANANA, BEAR, say: **That's right.** Click #1; then click **NEXT**. Computer automatically goes to next item.

Incorrect Response: If participant does not say BANANA, BEAR, say: **Let's try that again.**

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Trial 2: say: **The BEAR is an animal; the BANANA is a food. Now you tell me the food first and then the animal.** If participant says BANANA, BEAR, say: **That's right.** Click #2; then click **NEXT**. Computer automatically goes to next item.

If participant does not say BANANA, BEAR, say: **Let's try that once more.**

Trial 3: Click **PLAY** again; when screen is blank, say: **The BEAR is an animal; the BANANA is a food. Now you tell me the food first and then the animal.** If participant says BANANA, BEAR, say: **That's right.** Click #3; then click **NEXT**. Computer automatically goes to next item.

If participant answers any part of the question *incorrectly* after 3 trials, click #4; then click **NEXT**. **Test will be discontinued.**

2-List Practice Item 2:

Say: **Now we are going to do some more.**

Trial 1: Click **PLAY**; when screen is blank, say: **Tell me the food in size order from smallest to biggest and then tell me the animals in size order from smallest to biggest.**

Correct Response: If participant says PINEAPPLE, FROG, TIGER, say: **That's right.** Click #1; then click **NEXT**. Computer automatically goes to next item.

Incorrect Response: If participant does not say PINEAPPLE, FROG, TIGER, say: **Let's try that again.**

Trial 2: say: **You saw a frog, a pineapple, and a tiger. The pineapple is a food; the frog is the smallest animal, and the tiger is the biggest animal. Now, you tell me the food in size order starting with the smallest food, and then the animals in size order, from smallest to biggest.** If participant says PINEAPPLE, FROG, TIGER, say: **That's right.** Click #2; then click **NEXT**. Computer automatically goes to next item.

If participant does not say PINEAPPLE, FROG, TIGER, say: **Let's try that once more.**

Trial 3: Click **PLAY** again; when screen is blank, say: **You saw a frog, a pineapple, and a tiger. The pineapple is a food; the frog is the smallest animal, and the tiger is the biggest animal. Now, you tell me the food in size order starting with the smallest food, and then the animals in size order, from smallest to biggest.** If participant says PINEAPPLE, FROG, TIGER, say: **That's right.** Click #3; then click **NEXT**. Computer automatically goes to next item.

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If participant answers any part of the question *incorrectly* after 3 trials, click #4; then click **NEXT**. **Test will be discontinued.**

2-List Test Items

Say (for the first item and then only as necessary)**: Let's look at some more pictures. Remember, after you see the pictures, you will see a blank screen. Once you see this blank screen, tell me the foods first in size order from smallest to biggest, then the animals, in size order from smallest to biggest.** Click **PLAY;** mark the item *CORRECT* (Yes) or *INCORRECT* (No) based on the participant's response.

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Administration Instructions

Everything said to the participant is on the screen.

	Child's screen written content	Examiner (E) Actions
Practice-Intro	We're going to play a matching game with colors and shapes.	Reads screen; then clicks NEXT on E's screen.
SHAPE intro	We'll play the SHAPE game first. In the SHAPE game, choose the picture that's the same SHAPE as the picture in the middle of the screen. If it's a BOAT, choose this picture.	Points to BOAT; then demonstrates use of index finger.
	If it is a RABBIT, choose that picture.	Points to RABBIT; then demonstrates use of keyboard.
Transition	Now you try. Keep your eyes on the star. Answer as fast as you can without making mistakes. If you make a mistake, just keep going.	Reads screen; then clicks NEXT on E's screen.
Shape Practice	4 items sorted by shape	
More practice, if needed	Let's practice that some more. In the SHAPE game, choose the picture that's the same SHAPE as the picture in the middle of the screen. If it's a BOAT, choose this picture.	Chooses BOAT.
	If it's a RABBIT, choose that picture.	Chooses RABBIT.
Transition	Now you try. Keep your eyes on the star. Answer as fast as you can without making mistakes. If you make a mistake, just keep going.	Reads screen; then clicks NEXT.
Shape Practice again	4 items sorted by shape	
More practice, if needed	Let's practice that some more. In the SHAPE game, choose the picture that's the same SHAPE as the picture in the middle of the screen. If it's a BOAT, choose this picture.	Chooses BOAT.
	If it's a RABBIT, choose that picture.	Chooses RABBIT.
Transition	Now you try. Keep your eyes on the star. Answer as fast as you can without making mistakes. If you make a mistake, just keep going.	Reads screen; then clicks NEXT.
Shape Practice again	4 items sorted by shape	

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	Child's screen written content	Examiner (E) Actions
COLOR intro	We can also match by COLOR. In the COLOR game, choose the picture that's the same COLOR as the picture in the middle of the screen. If it's BROWN, choose this picture.	Points to; then chooses BROWN picture.
	If it's WHITE, choose that picture.	Points to; then chooses WHITE picture.
Transition	Now you try. Keep your eyes on the star. Answer as fast as you can without making mistakes. If you make a mistake, just keep going.	Reads screen; then clicks NEXT on examiner screen
Color Practice	4 items sorted by color	
More practice, if needed	Let's practice some more. In the COLOR game, choose the picture that is the same COLOR as the picture in the middle of the screen. If it's WHITE, choose this picture.	Chooses WHITE picture.
	If it's BROWN, choose that picture.	Chooses BROWN picture.
Transition	Now you try. Keep your eyes on the star. Answer as fast as you can without making mistakes. If you make a mistake, just keep going.	Reads screen; then clicks NEXT on E's screen.
Color Practice again	4 items sorted by color	
More practice, if needed	Let's practice some more. In the COLOR game, choose the picture that is the same COLOR as the picture in the middle of the screen. If it's WHITE, choose this picture.	Chooses WHITE picture.
	If it's BROWN, choose that picture.	Chooses BROWN picture.
Transition	Now you try. Keep your eyes on the star. Answer as fast as you can without making mistakes. If you make a mistake, just keep going.	Reads screen; then clicks NEXT on E's screen.
Color Practice again	4 items sorted by color	
COLOR and SHAPE intro	Now, we're going to play with some different SHAPES and COLORS. This time we'll use BALLS and TRUCKS that are YELLOW and BLUE.	
Pre-switch intro	Let's start with the COLOR game. Remember the COLOR game? In the COLOR game, choose the picture that's the same COLOR as the picture in the middle of the screen. If it's a BLUE one, choose this picture.	Chooses BLUE picture.

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	Child's screen written content	Examiner (E) Actions
	And if it's a YELLOW one, choose that picture.	Chooses YELLOW picture.
Transition	Now, you try. Keep your eyes on the star. Answer as fast as you can without making mistakes. If you make a mistake, just keep going.	Reads screen; then clicks NEXT on E's screen.
Color items—	5 items sorted by color (if child does not get 4 of 5 correct, test terminates)	
Post-switch intro	Now we're going to play the SHAPE game. Remember the SHAPE game? In the SHAPE game, choose the picture that's the same SHAPE as the picture in the middle of the screen. If it's a TRUCK, choose this picture.	Chooses TRUCK.
	And if it's a BALL, choose that picture.	Chooses BALL.
Transition	Now, you try. Keep your eyes on the star. Answer as fast as you can without making mistakes. If you make a mistake, just keep going.	Clicks NEXT on examiner screen.
Shape items-	5 items sorted by shape (if child does not get 4 of 5 correct, test terminates)	
Intro Mixed Items	We can also play both games together. Remember, when you see or hear the word SHAPE, choose the picture that's the same SHAPE as the picture in the middle of the screen. If it's a TRUCK, choose this picture.	Chooses TRUCK.
	And if it's a BALL, choose that picture.	Chooses BALL.
	When you see or hear the word COLOR, choose the picture that's the same COLOR as the picture in the middle of the screen. If it's a BLUE one, choose this picture.	Chooses BLUE picture.
	And if it's a YELLOW one, choose that picture.	Chooses YELLOW picture.
Transition	Now, you try. Keep your eyes on the star. Answer as fast as you can without making mistakes. If you make a mistake, just keep going.	Clicks NEXT on E's screen.
Test items	30 mixed items	

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Administration Instructions

Everything said to the participant is on the screen.

	Participant's screen written content	Examiner (E) Actions
Practice-Intro all ages	We're going to play a matching game with colors and shapes.	Reads screen; then clicks NEXT on E's screen.
SHAPE intro	We'll play the SHAPE game first. In the SHAPE game, choose the picture that's the same SHAPE as the picture in the middle of the screen. If it's a BOAT, choose this picture.	Points to BOAT; demonstrates use of index finger.
	If it's a RABBIT, choose that picture.	Points to RABBIT; then demonstrates use of keyboard.
Transition	Now you try. Keep your eyes on the star. Answer as fast as you can without making mistakes. If you make a mistake, just keep going.	Reads screen; then clicks NEXT on E's screen.
Shape Practice	4 items sorted by shape	
More practice, if needed	Let's practice that some more. In the SHAPE game, choose the picture that's the same SHAPE as the picture in the middle of the screen. If it's a BOAT, choose this picture.	Chooses BOAT.
	If it's a RABBIT, choose that picture.	Chooses RABBIT.
Transition	Now you try. Keep your eyes on the star. Answer as fast as you can without making mistakes. If you make a mistake, just keep going.	Reads screen; then clicks NEXT on E's screen.
Shape Practice again	4 items sorted by shape	
More practice, if needed	Let's practice that some more. In the SHAPE game, choose the picture that's the same SHAPE as the picture in the middle of the screen. If it's a BOAT, choose this picture.	Chooses BOAT.
	If it's a RABBIT, choose that picture.	Chooses RABBIT.
Transition	Now you try. Keep your eyes on the star. Answer as fast as you can without making mistakes. If you make a mistake, just keep going.	Reads screen; then clicks NEXT on E's screen.

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	Participant's screen written content	Examiner (E) Actions
Shape Practice again	4 items sorted by shape	
COLOR intro	We can also match by COLOR. In the COLOR game, choose the picture that's the same COLOR as the picture in the middle of the screen. If it's BROWN, choose this picture.	Points to; then chooses BROWN picture.
	If it's WHITE, choose that picture.	Points to; then chooses WHITE picture.
Transition	Now you try. Keep your eyes on the star. Answer as fast as you can without making mistakes. If you make a mistake, just keep going.	Reads screen; then clicks NEXT on E's screen
Color Practice	4 items sorted by color	
More practice, if needed	Let's practice some more. In the COLOR game, choose the picture that is the same COLOR as the picture in the middle of the screen. If it's WHITE, choose this picture.	Chooses WHITE picture.
	If it's BROWN, choose that picture.	Chooses BROWN picture.
Transition	Now you try. Keep your eyes on the star. Answer as fast as you can without making mistakes. If you make a mistake, just keep going.	Reads screen; then clicks NEXT on E's screen.
Color Practice again	4 items sorted by color	
More practice, if needed	Let's practice some more. In the COLOR game, choose the picture that is the same COLOR as the picture in the middle of the screen. If it's WHITE, choose this picture.	Chooses WHITE picture.
	If it's BROWN, choose that picture.	Chooses BROWN picture.
Transition	Now you try. Keep your eyes on the star. Answer as fast as you can without making mistakes. If you make a mistake, just keep going.	Reads screen; then clicks NEXT on E's screen.
Color Practice again	4 items sorted by color	
Test item intro	Now we're going to play both games together. Remember when you see the word SHAPE, choose the picture that's the same SHAPE as the picture in the middle of the screen. When you see the word COLOR, choose the picture that's the same COLOR as the picture in the middle of the screen.	Reads screen; then clicks NEXT on E's screen.

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	Participant's screen written content	Examiner (E) Actions
Transition	Now you try. Keep your eyes on the star. Answer as fast as you can without making mistakes. If you make a mistake, just keep going.	Reads screen; then clicks NEXT on E's screen.
Test items	30 mixed items	

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Administration Instructions

Most instructions are on the examiner's screen.

1) Say: **I would like you to use the pointer** (index) **finger** (show appropriate finger) **on this** (dominant) **hand to answer. If you want you can hold this ball in your other** (non-dominant) **hand so that you don't get mixed up.** Say: **Let's look at these two faces. One of them is a SMILEY face and the other is a FROWN face** (point).

2) Say: **Now I am going to show you some more pictures. On each screen, there will be two pictures. Sometimes the pictures look alike or the same, and sometimes the pictures do not look alike and are NOT the same. When the pictures look alike or the same, you should choose the SMILEY face** (point to left arrow)**. When they do NOT look alike or the same, you should choose the FROWN face** (point to right arrow). When the child understands the two faces, say: **Let's choose the SMILEY face and then look at some pictures together.** Again, demonstrate how to use the keyboard.

3) *Ages 3-7 Demonstration Item 1:*

Say: **Look at the boxes on the screen** (point); **in the boxes are two pictures – this picture** (point to left box) **and this picture** (point to right box). **These two pictures look alike or the same, so we'll choose the SMILEY face. Let's choose the SMILEY face together.** Demonstrate use of keyboard. Computer says: ***Great job!*** Next item will appear.

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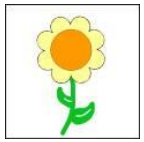
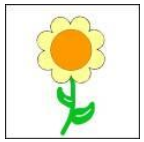
4) *Ages 3-7 Demonstration Item 2:*

Say: **Look at these pictures here** (point). **This picture** (point) **and this picture** (point) **do NOT look alike or the same. This picture** (point) **is purple but this picture** (point) **is orange. This means the pictures are NOT alike, not the same. So we'll choose the FROWN face. Let's choose the FROWN face together.** Demonstrate. Computer says: ***Great job!*** Next item will appear.

REVIEW: The pattern comparison practice items all have the same format. The examiner asks if the two pictures are the same or not the same. If child answers correctly, computer says: ***Good Job***. If child answers incorrectly, computer explains how response is wrong and the examiner says: **Let's try again. Are these the same?** If child does not choose correct response on second try, the computer moves to the next practice item after repeating the explanation above. The first practice item is detailed below and other items are outlined.

5) Say: **Now you do some to practice. Your job is to choose the SMILEY face if the pictures look alike or are the same and to choose the FROWN face if the pictures do not look alike or are not the same**.

Ages 3-7 Practice Item 1:

Say: **Are these the same? Remember, choose the SMILEY face if they look alike or are the same and chose the FROWN face if they do not look alike or are NOT the same.** (Discontinue questions or prompting when child understands instructions.)

If correct (**SMILEY face**), computer says: ***Great job!*** Next item will appear.

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If incorrect (**FROWN face**), computer says: ***The pictures look alike, the same. Both pictures are flowers that are the same size and color, so choose the SMILEY face***. **SMILEY face** will flash and item will stay on screen. Say: **Let's try again. Are these the same?** Once child has chosen **SMILEY face**, computer says: ***Great job!*** Next item will appear. If child chooses incorrectly another time, the computer moves to the next practice item after repeating explanation above.

6) Ages 3-7 Practice Item 2: Two flowers, one with stem, one without
7) Ages 3-7 Practice Item 3: Two gift boxes that are the same
8) Ages 3-7 Practice Item 4: Two flowers that have different colors
9) Ages 3-7 Practice Item 5: Two red flowers
10) Test Items:

NOTE: If child has not correctly chosen the SMILEY or FROWN face after both trials on 2 of the 5 practice items, testing will automatically terminate.

Otherwise, say: **Now we'll do some more. Remember, choose the SMILEY face if the pictures look alike or are the same and choose the FROWN face if the pictures do not look alike and are NOT the same. Make a choice as quickly as you can.** Click **NEXT** to start test and, if necessary, give prompts.

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Administration Instructions

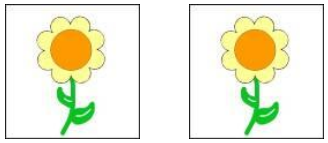
Most instructions are on the examiner's screen.

1) Say: **I am going to show you some pictures. On each screen there are two pictures. Sometimes the two pictures are the same, and sometimes the two pictures are NOT the same. If the pictures look the same, choose the YES button. If they do NOT look the same, choose the NO button. If you make a mistake during the practice, you will hear a message to try again. I would like you to use your** (dominant) **RIGHT/LEFT index finger** (show appropriate finger) **to respond.**

2) Say: **Let's begin our practice.** Click **NEXT**.

> **REVIEW**: The pattern comparison practice items all have the same format. The examiner asks if the two pictures are the same or not the same. If the participant answers correctly, the computer says: ***Good Job***. If participant answers incorrectly, the computer explains how the response is wrong and the examiner say: **Let's try again. Are these the same?** If the participant does not choose the correct response on the second try, the computer moves to the next practice item after repeating the explanation above. The first practice item is detailed below and other items are outlined.

3) Ages 8-85 Practice Item 1:



Say: **Are these the same?**

If correct (**YES**), computer says: ***That's right!*** Next item will appear.

If incorrect (**NO**), computer says: ***These pictures look alike or are the same; both pictures are flowers, so choose YES.*** **YES** will flash and item will stay on screen. Say: **Let's try again. Are these the same?** If participant has chosen **YES**, computer says: ***That's right!*** Next item will appear. If participant chooses incorrectly again, the computer moves to the next practice item after repeating the explanation above.

4) Ages 8-85 Practice Item 2: Two flowers, one with stem, one without

5) Ages 8-85 Practice Item 3: One package and three packages

6) Ages 8-85 Practice Item 4: Two of the same gift packages,

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7) Ages 8-85 Practice Item 5: Two flowers, different colors
8) Ages 8-85 Practice Item 6: Two flowers of the same color
9) Test Items:

> **NOTE**: If the participant does not respond correctly after both trials on 2 of the 6 practice items, testing will automatically terminate.

Otherwise, say**: Now we'll do some more. Remember, use your right/left** (dominant hand) **index finger to respond. Choose YES if the pictures look the same and choose NO if they do NOT look the same. It is important that you choose as quickly as you can**. Click **NEXT** to start test and, if necessary, give prompts.

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Administration Instructions

Most of the instructions are on the examiner's screen.

1) **Training Sequence**

Step 1: Moving pictures from the yellow box to the gray boxes

Step 2: Moving pictures from the gray boxes back to the yellow box

Step 3: Moving pictures between the gray boxes.

When first screen appears, say: **Now we are going to play a memory game but first I am going to teach you how to move the pictures on this screen.** Say: **Here you see some pictures in a yellow box** (flowers and vase)**.**

2) **Practice Sequences:**

General: There are 2 practice sequences. If child does not succeed after 2 trials on first practice sequence, PSM testing is discontinued. If child does not succeed after 4 trials on second practice sequence, PSM testing is discontinued.

Before beginning, say: **Now, we're going to play the memory game. I will show you some pictures on the computer. I want you to remember them; then, I want you to show them back to me in the same way I showed you.** Click **NEXT.**

Practice Sequence 1:

Say: **Now, I'm going to show you how to eat ice cream.** Click **PLAY.** As pictures are presented, a recorded voice will say the appropriate labels. Point to completed sequence and say: **That's how to eat ice cream.** Once computer has scrambled pictures, say: **Now, I want you to move the pictures to show me how to eat ice cream. I want you to show them back to me in the same way, in the same order that I showed you.**

When child appears finished, ask: **Are you finished?** When child says YES or is obviously finished, click **NEXT**. *If the child does not succeed with Practice Sequence 1 after two trials, PSM testing is discontinued.*

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Practice Sequence 2:

Say: **Now, I'm going to show you how to have a birthday party.** Click **PLAY.** As pictures are presented, a recorded voice will say the appropriate labels. After computer has presented pictures say: **That's how to have a birthday party.** Once computer has scrambled pictures, say: **Now, I want you to move the pictures to show me how to have a birthday party. I want you to show them back to me in the same way, in the same order that I showed you.**

When child appears finished, ask: **Are you finished?** When child says YES or is obviously finished, click **NEXT.** Repeat Practice Sequence 2, following steps above, until child responds correctly or sequence has been presented a total of 4 times. *If child does not succeed with Practice Sequence 2 after four trials, PSM testing is discontinued.*

3) **Test Sequences:**

Participants, ages 3-4, will be presented with 2 trials of a 6-step sequence.

Introduce the task, saying, **Now we are going to play a game with more pictures. Now I am going to show you how to play in the park.** Click **PLAY.** As the pictures are presented, a recorded voice will say the appropriate labels. Point to completed sequence and say: **That's how to play in the park**. Once computer has scrambled pictures, say: **Now, I want you to move the pictures to show me how to play in the park. I want you to show them back to me in the same way, in the same order that I showed you.**

When child appears finished, ask: **Are you finished?** When child says YES or is obviously finished, click **NEXT.** The same set of pictures will appear once more. Introduce the repeated sequence with the following: **We're going to do the same pictures again. Everyone is asked to do this more than once.** Click **PLAY.** Once computer has scrambled pictures, say: **Now, I want you to move the pictures to show me how to play in the park. I want you to show them back to me in the same way, in the same order that I showed you.**

When child appears finished, ask: **Are you finished?** When child says YES or is obviously finished, click **NEXT**.

The test will end itself after both trials have presented.

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Administration Instructions

Most of the instructions are on the examiner's screen.

1) **Training Sequence**

Step 1: Moving pictures from the yellow box to the gray boxes

Step 2: Moving pictures from the gray boxes back to the yellow box

Step 3: Moving pictures between the gray boxes.

When first screen appears, say: **Now we are going to play a memory game but first I am going to teach you how to move the pictures on this screen.** Say: **Here you see some pictures in a yellow box** (flowers and vase)**.**

2) **Practice sequences:**

General: There are 2 practice sequences. The child has 4 trials to complete each sequence. If the child fails all 4 trials of either practice sequence, PSM testing is discontinued.

Before beginning, say: **Now we are going to play the memory game. I will show you some pictures on the computer. I want you to remember them; then, I want you to show them back to me in the same way I showed you.** Click **NEXT.**

Practice Sequence 1:

Say: **Now, I'm going to show you how to have a birthday party.** Click **PLAY.** As pictures are presented, a recorded voice will say the appropriate labels. Point to completed sequence and say: **That's how to have a birthday party.** Once computer has scrambled pictures, say: **Now, I want you to move the pictures to show me how to have a birthday party. I want you to show them back to me in the same way, in the same order that I showed you.**

When child appears finished, ask: **Are you finished?** When child says YES or is obviously finished, click **NEXT**. *If child does not succeed with Practice Sequence 1 in 4 or fewer trials, PSM testing is discontinued.*

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Practice Sequence 2**:**

Say: **Now, I'm going to show you how to go camping.** Click **PLAY.** As pictures are presented, a recorded voice will say the appropriate labels. After the computer has presented the pictures, say : **That's how to go camping.** Once computer has scrambled pictures, say: **Now, I want you to move the pictures to show me how to go camping. Show me the pictures the same way, in the same order that I showed you.**

When child appears finished, say, **Are you finished?** When child says YES or is obviously finished, click **NEXT**. Repeat Practice Sequence 2, following the steps above, until child responds correctly or sequence has been presented a total of 4 times. *If child does not succeed with Practice Sequence 2 after four trials, PSM testing is discontinued.*

3) **Test Sequences:**

Participants, ages 5-6, will be presented with 2 trials of a 9-step sequence.

Introduce the task, saying: **Now we are going to do the same thing with more pictures. Now I am going to show you how to play in the park.** Click **PLAY.** As pictures are presented, a recorded voice will say the appropriate labels. Point to completed sequence and say: **That's how to play in the park.** Once computer has scrambled pictures, say: **Now, I want you to move the pictures to show me how to play in the park. I want you to show them back to me in the same way, in the same order that I showed you.**

When child appears finished, ask: **Are you finished?** When child says YES or is obviously finished, click **NEXT**. Introduce the repeated sequence with the following: **We're going to do the same pictures again. Everyone is asked to do this more than once.** Click **PLAY.** Once computer has scrambled pictures, say: **Now, I want you to move the pictures to show me how to play in the park. I want you to show them back to me in the same way, in the same order that I showed you.**

When child appears finished, ask: **Are you finished?** When child says YES or is obviously finished, click **NEXT**.

The test will end itself when two trials have been presented.

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Administration Instructions

Most of the instructions are on the examiner's screen.

1) **Training Sequence**

Step 1: Moving pictures from the yellow box to the gray boxes

Step 2: Moving pictures from the gray boxes back to the yellow box

Step 3: Moving pictures between the gray boxes.

When first screen appears, say: **Now we are going to play a memory game but first I am going to teach you how to move the pictures on this screen.** Say: **Here you see some pictures in a yellow box** (flowers and vase)**.**

2) **Practice sequences:**

General: There are 2 practice sequences. The child has 4 trials to complete each sequence. If the child fails all 4 trials of either practice sequence, PSM testing is discontinued.

Before beginning, say: **Now we are going to play the memory game. I will show you some pictures on the computer. I want you to remember them; then, I want you to show them back to me in the same way I showed you.** Click **NEXT.**

Practice Sequence 1:

Say: **Now, I'm going to show you how to have a birthday party.** Click **PLAY.** As pictures are presented, a recorded voice will say the appropriate labels. Point to completed sequence and say: **That's how to have a birthday party.** Once computer has scrambled pictures, say: **Now, I want you to move the pictures to show me how to have a birthday party. I want you to show them back to me in the same way, in the same order that I showed you.**

When child appears finished, ask: **Are you finished?** When child says YES or is obviously finished, click **NEXT**. *If child does not succeed with Practice Sequence 1 in 4 or fewer trials, PSM testing is discontinued.*

Practice Sequence 2**:**

Say: **Now, I'm going to show you how to go camping.** Click **PLAY.** As pictures are presented, a recorded voice will say the appropriate labels. After the computer has presented the pictures, say: **That's how to go camping.** Once computer has scrambled pictures, say: **Now, I want you to move the pictures to show me how to go camping. Show me the pictures the same way, in the same order that I showed you.**

When child appears finished, say, **Are you finished?** When child says YES or is obviously finished, click **NEXT.** Repeat Practice Sequence 2, following the steps above, until child responds correctly or sequence has been presented a total of 4 times. *If child does not succeed with Practice Sequence 2 after four trials, PSM testing is discontinued.*

3) **Test Sequences:**

Participants, age 7, will be presented with 1trial of a 15-step sequence and 1 trial of an 18-step sequence.

Introduce the task by saying, **Now we are going to do the same thing with more pictures. Now I am going to show you how to play in the park.** Click **PLAY.** As the pictures are presented, a recorded voice will say the appropriate labels. Point to completed sequence and say: **That's how to play in the park.**

Once computer has scrambled pictures, say: **Now, you move the pictures to show me how to play in the park. I want you to show them back to me in the same way, in the same order that I showed you.**

When child appears finished, ask: **Are you finished?** When child says YES or is obviously finished, click **NEXT**.

Introduce the new set of 18 pictures, say: **Now we're going to do the same pictures with some more pictures added. Everyone is asked to do this more than once.** Click **PLAY.** Once computer has scrambled pictures, say: **Now, you move the pictures to show me how to play in the park. I want you to show them back to me in the same way, in the same order that I showed you.**

When child appears finished, ask: **Are you finished?** When child says YES or is obviously finished, click **NEXT.**

The test will end itself when the 2 trials have been presented.

NIH Toolbox Administration

Administration Instructions

Most of the instructions are on the examiner's screen.

1) **Training Sequence**

Step 1: Moving pictures from the yellow box to the gray boxes

Step 2: Moving pictures from the gray boxes back to the yellow box

Step 3: Moving pictures between the gray boxes.

When first screen appears, say: **Now we are going to play a memory game but first I am going to teach you how to move the pictures on this screen.** Say: **Here you see some pictures in a yellow box** (flowers and vase).

2) **Practice Sequence:**

General: There is only 1 practice sequence. Participants will have 4 trials to learn the task. If participant does not succeed in 4 or fewer trials, PSM testing is discontinued.

Before beginning, say: **Now, we're going to play the memory game. I will show you some pictures on the computer. I want you to remember them; then, I want you to show them back to me in the same way I showed you.**

Say: **Now, I'm going to show you how to go camping.** Click **PLAY.** As pictures are presented, a voice recording will say the appropriate labels. Point to completed sequence and say: **That's how to go camping.** Once computer has scrambled pictures, say: **Now, I want you to move the pictures to show me how to go camping. I want you to show them back to me in the same way, in the same order that I showed you.**

When participant appears finished, say, **Are you finished?** When participant says YES or is obviously finished, click **NEXT**. *If participant does not succeed with the Practice Sequence after 4 trials, PSM testing is discontinued.*

3) **Test Sequences:**

Participants, ages 8-85, will be presented with 1trial of a 15-step sequence and 1 trial of an 18-step sequence.

Introduce the task by saying, **Now we are going to do the same thing with more pictures. Now I am going to show you how to play in the park.** Click **PLAY.** As the pictures are presented, a recorded voice will say the appropriate labels. Point to completed sequence and say: **That's how to play in the park.**

NIH Toolbox Administration

Once computer has scrambled pictures, say: **Now, you move the pictures to show me how to play in the park. I want you to show them back to me in the same way, in the same order that I showed you.**

When participant appears finished, ask: **Are you finished?** When participant says YES or is obviously finished, click **NEXT**.

Introduce the new set of 18 pictures, say: **Now we're going to do the same pictures with some more pictures added. Everyone is asked to do this more than once.** Click **PLAY.** Once computer has scrambled pictures, say: **Now, you move the pictures to show me how to play in the park. I want you to show them back to me in the same way, in the same order that I showed you.**

When participant appears finished, ask: **Are you finished?** When participant says YES or is obviously finished, click **NEXT**.

The test will end itself when the 2 trials have been presented.

NIH Toolbox Administration

Administration Instructions

1) Say: **Now I'm going to show you some letters and some words. I want you to read each letter or word out loud. Read each one loud enough so that I can hear you. Some will be easy and some will be hard. Don't worry if you don't know the word or its meaning – just read it out loud the best you can. Let's begin.** Click **START TEST**.

2) When the first item appears, say: **Tell me, what is this letter/word?** (Say whichever is appropriate. This prompt can be repeated as many times as is needed.)

   For children ages 3-4, the first item(s) will require the participant to point to a letter rather than name it. Follow the on-screen instructions**.** Note: One or more of these items may be administered to older participants, depending on their performance on the test and what the computer selects to display for a given participant.

3) If the participant says: I don't know this one or I can't read it, say: **It is OK if you don't know the word or what it means – just try to read it as best you can.** This prompt can be used to reassure participants if they refuse to read the letters/words. If, after prompting, a participant refuses to offer a response, mark the item incorrect (**No**) and the computer will move on to the next item.

   Once the examiner scores an item (selects **Yes** or **No**), he or she should select the **NEXT** button to move on to the next item.

   NOTE: The examiner can change one previous item after selecting the **NEXT** button, by clicking the **Go Back** button.

NIH Toolbox Administration

Administration Instructions

All instructions read by the examiner are on the computer screen.

NIH Toolbox Administration

Administration Instructions

All instructions for administration and those read by the examiner are on the computer screen.

NIH Toolbox Administration

Administration Instructions

Most instructions are on the examiner's screen.

Say: **In this activity we are going to see how fast you work with your hands.** If handedness not known, use protocol. If examiner knows, say: **You usually use this hand, right?** (Point to dominant hand.)

Dominant Practice: Say: **This is a pegboard and these are the pegs. All the pegs are the same. Pick up the pegs one at a time using this** (dominant hand, say: **your right** or **left**) **hand only. Put them in the holes one at a time until all 9 holes are filled. Then take them all out, one at a time, like this.** (Demonstrate). **The pegs can be put in the holes or taken out in any order. I have extra pegs, so if you drop a peg, don't go after it. I'll put in another one.** Continue: **Let's practice with this** (point; say: **your right** or **left**) **hand. You can use your other hand to hold the board in place. Are you ready? 3, 2, 1, Go!** Start timer on screen when you say **go**, move cursor to **stop** button, and stop timer when participant places final peg in cup.

Test Trial (dominant): Say: **Now I will time how fast you can do this. Pick up the pegs one at a time using only this** (point; say: **your right** or **left**) **hand. Put them in the holes, one at a time, until all 9 holes are filled. Then take them all out, one at a time. The pegs can be put in the holes or taken out in any order. Remember to work as fast as you can. Are you ready? 3, 2, 1 Go!** Start timer on screen when you say **go**, move cursor to **stop** button, and stop timer when participant places final peg in cup. As participant is placing final peg, say: **And take them out.**

Non-Dominant Practice: Turn pegboard around, say: **Now we are going to do the same thing with your other hand. Again, pick up the pegs one at a time using only this** (point; say: **your right** or **left**) **hand. Put them in the holes, one at a time, until all 9 holes are filled. Then take them all out, one at a time. The pegs can be put in the holes or taken out in any order.** Continue: **Let's practice. Remember, you can use your other hand to hold the board in place. Are you ready? 3, 2, 1, Go!** Start timer on screen when you say **go**, move cursor to **stop** button, and stop timer when participant places final peg in cup.

Test Trial (non-dominant): Say: **Now I will time how fast you can do this. Pick up the pegs one at a time using this** (point; say: **right** or **left**) **hand only. Put them in the holes, one at a time, until all 9 holes are filled. Then take them all out, one at a time. The pegs can be put in the holes or taken out in any order. Remember to go as fast as you can. Are you ready? 3, 2, 1 Go!** Start timer on screen when you say **go**, move cursor to **stop** button, and stop timer when participant places final peg in cup. As participant is placing final peg, say: **And take them out.**

NIH Toolbox Administration

Administration Instructions

Show the dynamometer, say: **We will use this machine to measure how strong your hands are. You will squeeze the handle 2 times** (one practice and one test trial) **with each hand while your arm is against your side and your elbow is bent like this** (90 degrees)**. The handle won't move, but the machine will show how hard you squeezed. See?** (Show force measurement) **Do you have any questions?**

Practice (*dominant hand*): Press ***RESET*** and ***TEST*** on dynamometer before trial. Say: **Let's practice; first we'll use this** (dominant hand, **your right** or **left**) **hand. When I say 'squeeze', I want you to squeeze the handle hard but not as hard as you can.** Support dynamometer during testing. Continue: **Ready? 3-2-1-squeeze.** After 3-4 seconds, say: **Stop.** Press ***RESET*** and ***TEST*** on dynamometer before next trial.

Practice (*non-dominant hand*): Continue: **Now we'll practice with your other hand** (put dynamometer in other hand). **When I say 'squeeze', I want you to squeeze the handle hard but not as hard as you can.** Support dynamometer during testing. Continue: **Ready? 3-2-1-squeeze.** After 3-4 seconds, say: **Stop.** Press ***RESET*** and ***TEST*** on dynamometer before next trial.

Test Trial *(dominant hand):* Say: **Now we're going to test each hand, beginning with this** (point; say **your right** or **left**) **hand. When I say 'squeeze', this time I want you to squeeze the handle as hard as you can.** Support dynamometer during testing. Continue: **Ready? 3-2-1-squeeze! Harder, harder, harder.** After 3-4 seconds, say: **Stop.**

Record force to nearest tenth of a pound on record sheet for transfer to computer. Press ***RESET*** and ***TEST*** on dynamometer before next trial.

Test Trial *(non-dominant):* Say: **OK, now we're going to test your other** (point; say **your right** or **left**) **hand. When I say 'squeeze', this time I want you to squeeze the handle as hard as you can.** Support the dynamometer during testing. Continue: **Ready? 3-2-1-squeeze! Harder, harder, harder.** After 3-4 seconds, say: **Stop.**

Record force to nearest tenth of a pound on the computer screen. ***Turn off*** dynamometer when testing is completed.

NIH Toolbox Administration

Administration Instructions

Have participant take off shoes!!

While putting the belt and accelerometer on participant, say: **This is a test of your balance. There are as many as 5** (or, for children ages 3-6, **4**) **different poses that you will be asked to do. During each pose, you will be asked to stand as steady as possible for 50 seconds. You will have a second chance if you cannot hold the position for 50 seconds. Between each set of poses, you may rest in the chair if needed. Please try to do your best. I will demonstrate how I want you to stand before each pose.**

Explain that the accelerometer on the belt is used to measure balance and ask permission to put on the belt or ask the participant to help. The belt should fit tightly around the pelvis and the handles of the belt should be positioned to the back of the participant. For ages 7 and older, the accelerometer is placed on the front of the belt. For ages 3-6, the accelerometer should be placed on the back of the belt (and the handles on the belt should be on the participant's side).

Throughout the testing, the participant should be reminded that he/she can step out of the pose if he/she is feeling unsafe or unable to hold the pose.

Pose 1: Flat surface, feet together, eyes open: Demonstrate the pose; then ask participant to take pose, saying: **Please stand with your feet together (heels & balls of feet touching) and as still as possible with your eyes open and with your arms crossed on your chest, like this** (demonstrate)**. Focus on the X (or picture) shown on the wall in front of you. Ready?** Click **START** button, waits for tone, and immediately say: **Go.**

If participant did not successfully complete trial, computer will display trial 2 of this pose; say: **Let's try that one again. Please stand with your feet together (heels & balls of feet touching) and as still as possible with your eyes open and with your arms crossed on your chest, like this** (demonstrate). **Focus on the X (or picture) shown on the wall in front of you. Ready?** Click **START** button, wait for tone, and immediately say: **Go.** Once the participant successfully completes a trial, say: **Are you ready for the next one?** Proceed with the next pose or allow the participant to rest. If participant fails trial 2, the discontinue rule is invoked; say: **We are done with this activity.**

Pose 2: Flat surface, feet together, eyes closed: This is the same as Pose 1, except participant's eyes are closed. Demonstrate; then ask participant to take pose, saying: **Please stand with your feet together (heels & balls of feet touching) and as still as possible with your eyes *closed* and with your arms crossed on your chest, like this** (demonstrate)**. Ready?** Click **START** button, wait for tone, and immediately say: **Go.**

NIHToolbox Administration

If participant did not successfully complete trial, computer will display trial 2 of this pose; say: **Let's try that one again. Please stand with your feet together (heels & balls of feet touching) and as still as possible with your eyes *closed* and with your arms crossed on your chest, like this** (demonstrate)**. Ready?** Click **START** button, wait for tone, and immediately say: **Go.** After participant completes one or both trials, say: **Are you ready for the next one?** Proceed with the next pose or allow the participant to rest.

Pose 3: Foam surface, feet together, eyes open: Pick up blue pad; place on the floor 1 meter in front of X (or picture) on wall. Demonstrate pose; then ask participant to take pose, saying: **Please step onto the foam and put your feet together (heels & balls of feet touching) and stand as still as possible with your eyes open and your arms crossed on your chest, like this** (demonstrate)**. Focus on the X (or picture) shown on the wall in front of you. Ready?** Click **START** button, wait for tone, and immediately say: **Go.**

If participant did not successfully complete trial, computer will display trial 2 of this pose; say: **Let's try that one again. Please step onto the foam and put your feet together (heels & balls of feet touching) and stand as still as possible with your eyes open and your arms crossed on your chest, like this** (demonstrate)**. Focus on the X (or picture) shown on the wall in front of you. Ready?** Click **START** button, wait for tone, and immediately say: **Go.** Once the participant successfully completes a trial, say: **Are you ready for the next one?** Proceed with the next pose or allow the participant to rest, following the procedures noted earlier. If participant fails trial 2, the discontinue rule is invoked; say: **We are done with this activity.**

Pose 4: Foam surface, feet together, eyes closed: This is the same as Pose 3 except participant's eyes are closed. Demonstrate pose; then ask participant to take pose, saying: **Please step onto the foam and put your feet together (*heels & balls of feet touching*) and stand as still as possible with your arms crossed on your chest, and then close your eyes, like this** (demonstrate)**. Ready?** Click **START** button, wait for tone, and immediately say: **Go.**

If participant did not successfully complete trial, computer will display trial 2 of this pose; say: **Let's try that one again. Please step onto the foam and put your feet together (heels & balls of feet touching) and stand as still as possible with your eyes open and your arms crossed on your chest, like this** (demonstrate)**. Focus on the X (or picture) shown on the wall in front of you. Ready?** Click **START** button, wait for tone, and immediately say: **Go.** After participant completes one or both trials, say: **Are you ready for the next one?** Proceed with the next pose or allow the participant to rest.

Pose 5: Flat surface, tandem stance, eyes open (Ages 7-85 only): Demonstrate pose; then ask participant to take pose, saying: **Please stand with the heel of one foot touching the toes of the other foot on the ground. Keep them in a straight line. Stand as still as possible with your eyes open and with your arms crossed on your chest, like this** (demonstrate)**. Before you do this, try each foot in front and decide for yourself which one is more comfortable. Then, focus on the X (or picture) shown on the wall in front of you. Ready?** Click **START** button, wait for the tone, and immediately says: **Go.**

NIH Toolbox Administration

If participant did not successfully complete trial, computer will display trial 2 of this pose; say: **Let's try that one again. Please stand with the heel of one foot touching the toes of the other foot on the ground. Keep them in a straight line. Stand as still as possible with your eyes open and with your arms crossed on your chest, like this** (demonstrate)**. Focus on the X (or picture) shown on the wall in front of you. Ready?** Click **START** button, wait for tone, and immediately say: **Go.**

When participant has completed pose 5, say: **We are done with this activity.**

NIH Toolbox Administration

Administration Instructions

Practice Trial: Show the walking course; say: **This activity involves walking from one place to another. This is our walking course** (point to the course)**. I want you to walk to the other end of the course at your usual speed, just as if you were walking down the street to go to the store.**

The examiner explains the walk: **Let me show you what I want you to do. Put both your feet together behind this line. Walk all the way past the cone on the other end before you stop.** Before demonstration, say: **3, 2, 1, Go!** After examiner returns, have participant stand with both feet touching the start line and say: **When I want you to start, I will say: 3, 2, 1, go. Do you have any questions?**

Say: **Now you try. Remember to walk at your usual speed and keep walking until you pass the cone. Ready? 3, 2, 1, Go!** When participant passes the cone, say: **That's good. Do you have any questions?** (Answer any questions.)

Trial 1: Say: **This time, I am going to time you as you walk at your usual speed. Are you ready? 3, 2, 1, Go!**

Begin timing (press start/stop button) when the participant steps over (first footfall) the starting line. Walk behind and to the side of the participant as he/she walks. Stop timing when one of the participant's feet is completely across the end/finish line (the line at 4.0 meters – not the line at 5.0 meters). If the participant stumbles or tries to run, void that trial and ask the participant to do another trial. Record the data on the record form and later transfer to the computer data entry forms.

Trial 2: Say: **Now I want you to repeat the walk. Remember to walk at your usual pace, and go all the way past the other end of the course. I am going to time you as you walk at your usual speed. Are you ready? 3, 2, 1, Go!**

Begin timing (press start/stop button) when the participant steps over (first footfall) the starting line. Walk behind and to the side of the participant as he/she walks. Stop timing when one of the participant's feet is completely across the end/finish line (the line at 4.0 meters – not the line at 5.0 meters). If the participant stumbles or tries to run, void that trial and ask the participant to do another trial. Record the data on the record form and later transfer to the computer data entry forms.

If needed, have the participant rest on a chair for at least one minute before the next task.

NIH Toolbox Administration

		Unable to complete	Comments
4 meter Walk Test (trial 1)	MM:SS.00		
4 meter Walk Test (trial 2)	MM:SS.00		

NIH Toolbox Administration

Administration Instructions

Practice Trial: Show the walking course; say: **This activity involves walking from one place to another. This is our walking course** (point to the course)**. I want you to walk to the other end of the course at your usual speed, just as if you were walking down the street to go to the store.**

The examiner explains the walk: **Let me show you what I want you to do. Put both your feet together behind this line. Walk all the way past the cone on the other end before you stop.** Before demonstration, say: **3, 2, 1, Go!** After examiner returns, have participant stand with both feet touching the start line and say: **When I want you to start, I will say: 3, 2, 1, go. Do you have any questions?**

Say: **Now you try. Remember to walk at your usual speed and keep walking until you pass the cone. Ready? 3, 2, 1, Go!** When participant passes the cone, say: **That's good. Do you have any questions?** (Answer any questions.)

Trial 1: Say: **This time, I am going to time you as you walk at your usual speed. Are you ready? 3, 2, 1, Go!**

Begin timing (press start/stop button) when the participant steps over (first footfall) the starting line. Walk behind and to the side of the participant as he/she walks. Stop timing when one of the participant's feet is completely across the end/finish line (the line at 4.0 meters – not the line at 5.0 meters). If the participant stumbles or tries to run, void that trial and ask the participant to do another trial. Record the data on the record form and later transfer to the computer data entry forms.

Trial 2: Say: **Now I want you to repeat the walk. Remember to walk at your usual pace, and go all the way past the other end of the course. I am going to time you as you walk at your usual speed. Are you ready? 3, 2, 1, Go!**

Begin timing (press start/stop button) when the participant steps over (first footfall) the starting line. Walk behind and to the side of the participant as he/she walks. Stop timing when one of the participant's feet is completely across the end/finish line (the line at 4.0 meters – not the line at 5.0 meters). If the participant stumbles or tries to run, void that trial and ask the participant to do another trial. Record the data on the record form and later transfer to the computer data entry forms.

If needed, have the participant rest on a chair for at least one minute before the next task.

NIH Toolbox Administration

		Unable to complete	Comments
4 meter Walk Test (trial 1)	MM:SS.00		
4 meter Walk Test (trial 2)	MM:SS.00		

NIH Toolbox Administration

Administration Instructions

1) Say: **This is an activity that shows how physically fit you are by seeing how far you can walk in 2 minutes. I will ask you to walk as fast as you can until I ask you to stop. I know this is hard for some people so don't worry if you have to slow down or rest. If you do stop or slow down, start walking again as soon as you feel you are ready do so.**

2) Ask: **Is there any reason you cannot do the walk? Does anything hurt or are you in pain? What I would like here is to have you walk as far as you can in this short period of time.**

3) Continue: **You and I will not talk while you are walking because this might make you walk more slowly. I will, however, let you know how much time you have to walk and when you are almost done.**

4) Demonstrate first part of task; say: **Let me show you what you are going to do. You will start with your feet behind this line. When I say 'Go,' you will walk back and forth around the cones as fast as you can without running or hurting yourself. You will begin after I say 'Ready, 3, 2, 1, Go!' As you pass the cone, do not stop or slow down. When I tell you to stop, stop where you are on the path until I come to you.**

5) Demonstrate first lap; say: **Watch me as I show you. You see that I am walking fast but not running and that I am not slowing or stopping when I pass the cone. Do you have any questions?** Answer questions as necessary.

6) Ask participant to walk course once down and back; say: **Now you can practice. Walk the path, out and back one time; go around the cone without slowing down. Ready, 3, 2, 1, Go!** When participant finishes, say: **Do you have any questions?** Answer any questions.

7) Continue: **This time, I will be timing you. Remember, when I say 'Go,' walk back and forth around the cones as fast as possible for 2 minutes without running or hurting yourself. Ready, 3, 2, 1, Go!**

8) 1 minute: **You are doing well. You have 1 minute to go.** **If participant is resting at one-minute reminder, encourage him/her to continue and change statement to: **You have only 1 minute left. Rest as long as you need; start walking again as soon as you feel able to do so.**

9) When time reads 1:45, say: **In a moment, I'm going to ask you to stop. When I do, just stop right where you are and I will come to you.** When 5 seconds remain, examiner should count down: **5, 4, 3, 2, 1, stop.** Have participant rest.

10) Put a piece of tape on the floor to mark where participant stopped; **the tape should be placed behind the participant's heel**. Measure distance from the last lap to the tape. Put distance on the record sheet and later transfer it to computer.

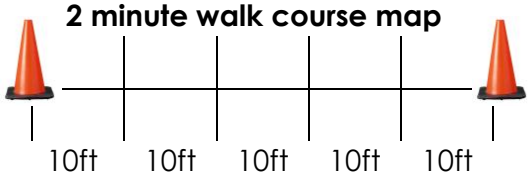
NIH Toolbox Administration

LAP GRID (cross off each time participant rounds a cone)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28

# Turns			
Additional # 10ft marks			
Additional feet & inches	Feet inches		
Did the participant stop (circle)	**Yes**	**No**	**If yes, time at 1st stop:** Minutes Seconds
Unable to complete (circle)	**Yes**	**No**	**Comments:**

2 minute walk course map



NIH Toolbox Administration

Administration Instructions

1) Say: **This is an activity that shows how physically fit you are by seeing how far you can walk in 2 minutes. I will ask you to walk as fast as you can until I ask you to stop. I know this is hard for some people so don't worry if you have to slow down or rest. If you do stop or slow down, start walking again as soon as you feel you are ready do so.**

2) Ask: **Is there any reason you cannot do the walk? Does anything hurt or are you in pain? What I would like here is to have you walk as far as you can in this short period of time.**

3) Continue: **You and I will not talk while you are walking because this might make you walk more slowly. I will, however, let you know how much time you have to walk and when you are almost done.**

4) Demonstrate first part of task; say: **Let me show you what you are going to do. You will start with your feet behind this line. When I say 'Go,' you will walk back and forth around the cones as fast as you can without running or hurting yourself. You will begin after I say 'Ready, 3, 2, 1, Go!' As you pass the cone, do not stop or slow down. When I tell you to stop, stop where you are on the path until I come to you.**

5) Demonstrate first lap; say: **Watch me as I show you. You see that I am walking fast but not running and that I am not slowing or stopping when I pass the cone. Do you have any questions?** Answer questions as necessary.

6) Ask participant to walk course once down and back; say: **Now you can practice. Walk the path, out and back one time; go around the cone without slowing down. Ready, 3, 2, 1, Go!** When participant finishes, say: **Do you have any questions?** Answer any questions.

7) Continue: **This time, I will be timing you. Remember, when I say 'Go,' walk back and forth around the cones as fast as possible for 2 minutes without running or hurting yourself Ready, 3, 2, 1, Go!**

8) 1 minute: **You are doing well. You have 1 minute to go.** **If participant is resting at one-minute reminder, encourage him/her to continue and change statement to: **You have only 1 minute left. Rest as long as you need; start walking again as soon as you feel able to do so.**

9) When time reads 1:45, say: **In a moment, I'm going to ask you to stop. When I do, just stop right where you are and I will come to you.** When 5 seconds remain, examiner should count down: **5, 4, 3, 2, 1, stop.** Have participant rest.

10) Put a piece of tape on the floor to mark where participant stopped; **the tape should be placed behind the participant's heel**. Measure distance from the last lap to the tape. Put distance on the record sheet and later transfer it to computer.

NIH Toolbox Administration

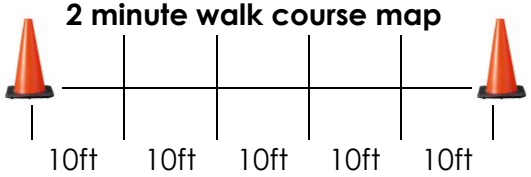
3 - 85+

LAP GRID (cross off each time participant rounds a cone)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28

# Turns			
Additional # 10ft marks			
Additional feet & inches	Feet inches		
Did the participant stop (circle)	**Yes**	**No**	**If yes, time at 1st stop:** Minutes Seconds
Unable to complete (circle)	**Yes**	**No**	**Comments:**

2 minute walk course map



NIH Toolbox Administration

NIH Toolbox
Motor Domain Data Collection Form

Date _____ / _____ / _____ Participant ID _____

Handedness: **Right** **Left** **Not known (circle)**

	Right	Left	Unable to complete	Comments
9-hole Pegboard	MM:SS.00	MM:SS.00		
Grip Strength	lbs	lbs		
4 meter Walk Test (trial 1)	MM:SS.00			
4 meter Walk Test (trial 2)	MM:SS.00			

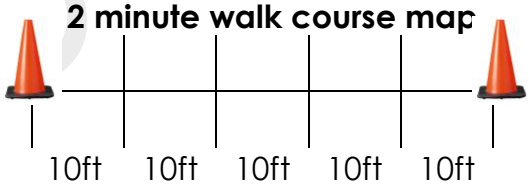
2 Minute Walk Test

LAP GRID (cross off each time participant rounds a cone).

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

# Turns			
Additional # 10ft marks			
Additional feet & inches	Feet inches		
Did the participant stop (circle)	**Yes**	**No**	**If yes, time at 1st stop:** Minutes Seconds
Unable to complete (circle)	**Yes**	**No**	**Comments:**

2 minute walk course map



NIH Toolbox

Administration Instructions

Adults, children, and child proxies each receive slightly different instructions **on the screen**; these are given below:

For Adults (ages 18-85):

On the next screens, we will ask you questions about your thoughts, feelings and behaviors. Read each question carefully and answer as well as you can. There is no right or wrong answer, only what is true for you and describes your thoughts, feelings, and behaviors. Some questions may seem similar to ones you have already answered. This is intentional. Please consider each question by itself and choose an answer that shows how you behave or what you really feel or believe.

After you make your choice, the computer will automatically go on to the next question. If you want to change your answer, click on the GO BACK button to return to the question, then choose a different answer.

Click on the NEXT button when you are ready to begin.

For Children (ages 8-17):

On the next screens, we will ask you questions about your thoughts, feelings and behaviors. Read each question carefully and answer as well as you can. There is no right or wrong answer, only what is true for you and describes your thoughts, feelings, and behaviors. Some questions may seem like ones you have already answered. This is on purpose. Please think about each question by itself and choose the answer that shows how you behave or what you really feel or believe.

After you make your choice, the computer will automatically go on to the next question. If you want to change your answer, click on the GO BACK button to return to the question, then choose a different answer.

Click on the NEXT button when you are ready to begin.

For Child Proxies (ages 3-12):

On the next screens, you will see questions about your child's feelings and behaviors. Read each question carefully and answer as best you can. There is no right or wrong answer, just answer what you believe accurately describes your child's feelings and behaviors. Some questions may seem similar to ones you have already answered. This is intentional. Please consider each question by itself and choose an answer that shows what you really feel or believe about your child.

After you make your choice, the computer will automatically go on to the next question. If you want to change your answer, click on the GO BACK button to return to the question, then choose a different answer.

Click on the NEXT button when you are ready to begin.

NIH Toolbox Administration

Administration Instructions

All instructions are on the participant's screen.

Two instruments (Promis Pain Interference CAT and Pain Intensity) make up the measurement of this construct. Each is self-administered; for each, instructions are presented on the computer screen. Both instruments are presented as one measure to the participant.

The Promis Pain Interference CAT asks participants about how their experience of pain interfered with or affected their enjoyment of various daily activities in the past seven days. The scale is computer-adapted and has a minimum of four questions and a maximum of 12 questions. The questions ask for a response on a 5-point scale. Some of the items are rated: Not at all; A little bit; Somewhat; Quite a bit; Very much; other items are rated: Never; Rarely; Sometimes; Often; Always.

Pain Intensity consists of one item asking about the participant's level of pain in the past seven days. Participants are asked to rate their pain on a scale from 0 (no pain) to 10 (worst imaginable pain).

NIH Toolbox Administration

Administration Instructions

All administration Instructions are on the examiner screen.

Part 1: Picture Identification:

The examiner should say: **Now, we're going to look at some pictures. I want to see if you know what they are.**

Question 1: Say: **Point to the picture of a *flower.*** If incorrect, point to the flower and say: **This is a *flower.*** Mark *correct (Yes)* or *incorrect (No)* on the examiner screen. Say: **Have you ever smelled a *flower?*** Mark *yes* or *no* on the examiner screen.

Question 2: Say: **Point to the picture of *popcorn.*** If incorrect, point to the popcorn and say: **This is *popcorn.*** Mark *correct (Yes)* or *incorrect (No)* on the examiner screen. Say: **Have you ever tasted or smelled *popcorn?*** Mark *yes* or *no* on the examiner screen.

Question 3: Say: **Point to the picture of *lemon.*** If incorrect, point to the picture of the lemon and say: **This is *lemon.*** Mark *correct (Yes)* or *incorrect (No)* on the examiner screen. Say: **Have you ever tasted or smelled *lemon?*** Mark *yes* or *no* on the examiner screen.

Question 4: Say: **Point to the picture of *Play Doh.*** If incorrect, point to the picture of Play Doh and say: **This is *Play Doh.*** Mark *correct (Yes)* or *incorrect (No)* on the examiner screen. Say: **Have you ever smelled *Play* Doh?** Mark *yes* or *no* on the examiner screen.

Question 5: Say: **Point to the picture of *cinnamon.*** If incorrect, point to the picture of cinnamon and say: **This is *cinnamon.*** Mark *correct (Yes)* or *incorrect (No)* on the examiner screen. Say: **Have you ever tasted or smelled *cinnamon?*** Mark *yes* or *no* on the examiner screen.

Question 6: Say**: Point to the picture of *coffee.*** If incorrect, point to the picture of coffee and say: **This is *coffee.*** Mark *correct (Yes)* or *incorrect (No)* on the examiner screen. Say: **Have you ever smelled *coffee?*** Mark *yes* or *no* on the examiner screen.

Question 7: Say: **Point to the picture of *chocolate.*** If incorrect, point to the picture of chocolate and say: **This is *chocolate.*** Mark *correct (Yes)* or *incorrect (No)* on the examiner screen. Say: **Have you ever tasted or smelled *chocolate?*** Mark *yes* or *no* on the examiner screen.

Question 8: Say: **Point to the picture of *bubble gum.*** If incorrect, point to the picture of bubble gum and say: **This is *bubble gum.*** Mark *correct (Yes)* or *incorrect (No)* on the examiner screen. Say: **Have you ever smelled or tasted *bubble gum*?** Mark *yes* or *no* on the examiner screen.

NIH Toolbox Administration

At the end of these questions, the examiner's screen will be refreshed with the names of those pictures that were not correctly identified on the first trial. These items will appear on the examiner's screen one at a time, and are to be repeated with the instruction: '**Point to the picture of…,'** and again the examiner will mark *correct* or *incorrect,* correcting the child for any errors in identification by saying: **This is….** (Note: the examiner should *not* repeat the Have you ever smelled… question to the child.) Regardless of the child's performance on the picture identification task, the computer will then move on to odor identification.

Part 2: Odor Identification:

For this age group, the examiner will scratch the card and hand it to the participant, saying: **I am going to give you some stickers to smell. After you have smelled the sticker, click on the picture that shows what you just smelled. If you want to change your choice, click on the hand, also called the GO BACK button. Let's begin.** If the participant is having difficulty using the mouse, the examiner may operate the mouse and the child can point.

When the child has completed all five cards, say: **We are done with the smells.**

NIH Toolbox Administration

Administration Instructions

All administration Instructions are on the examiner screen.

1) Before beginning the task, the examiner says: **This task involves smelling various odors, one at a time, and then trying to identify them. The odors that you will smell are chosen from a variety of foods and objects that people experience in everyday life. We are using scratch 'n' sniff cards to present the odors.**

2) The examiner continues: **Take this scratcher and scratch the first card; smell it right after you scratch it, then look at the pictures on the screen. Click on the picture that best shows the odor that you smelled on the card. A new set of pictures will then appear on the screen and you will be asked to identify the odor on the next card. If you want to change your last answer, click on the GO BACK button.**

3) The examiner should repeat this sequence of handing the cards to the participant to scratch, smell, and identify until all the cards have been used. For each trial, or as needed, repeat what was said above: **Take this scratcher and scratch this card; smell it, then look at the pictures on the screen. Click on the picture that best shows the odor that you smelled on the card. If you want to go back to change your last answer, click on the GO BACK button.**

4) When the participant has completed all nine cards, say: **You have finished this activity.**

Toolbox Administration

Administration Instructions

A laminated card with four letters is used with young participants.

If the child does not succeed in the training (as outlined below), testing should be discontinued.

Training:

Once the child is seated in a chair that is 12.5 feet from the monitor, say: **Now we are going to do an activity that shows us how well you can see pictures on the TV screen.** Hand the child the laminated card and say: **Everything you will see is shown on this card. This is a picture of an H, this is a picture of an O, this is a picture of a T, and this is a picture of a V** (point to each letter while naming)**. Now, you try to name the pictures.**

Encourage the child to name the letters as best he/she can. If the child names all four letters correctly, say: **Good job.** If any are named incorrectly, point to each letter and say ***only one time*** as before: **This is a picture of an H, this is a picture of an O, this is a picture of a T, and this is a picture of a V.** (Because letter naming is not required to complete the test, it is OK if the child does not correctly name each letter. Encourage the child's efforts without providing negative feedback.) Then say: **Let's do some more.**

Say: **You are going to look on this screen** (point to monitor)**; then, you will see a picture** (for children who clearly know the alphabet, it is OK to say letter instead of picture)**. Each time, I want you to tell me or point on this card to what you saw on the screen. If you are not sure, it is OK to guess. Are you ready to start? Let's begin.**

Practice:

The examiner should click the **START TEST** button on the examiner's screen. The examiner will present one set of practice visual acuity trials (four letters) at size 20/400.

a. If the child gets three or more correct, continue to visual acuity testing.

b. If the child misses two or more of four, review the laminated 'pointing chart' and ask him/her to identify (either orally or by pointing) the four letters HOTV. If all are done correctly, see step c below. If child cannot correctly identify the optotypes on the HOTV set, repeat the training above one more time.

c. Proceed to a second practice trial set. If three or more of four are done correctly, proceed to live visual acuity testing. If not, repeat (third practice trial set). If three or more are correct on the third practice trial, begin visual acuity testing. If two or more are incorrect, stop the test since this is the third practice trial (step d below).

d. Practice trials should be limited to a total of three sets. If, after three trials, the criterion of three or more of four correct is not achieved, then stop the test.

NIH Toolbox Administration

Visual Acuity Testing:

The examiner should say: **You did great. Now, the letters will get smaller and smaller until you cannot really see them. That is ok. We want to know how small they can get before you cannot see them.**

The examiner should click **NEXT** on the examiner's screen. Each time a letter is displayed, say: **Tell me or point to what you see.**

It is the examiner's job to use the computer to record (click) whether the response was correct or incorrect. Simply note the child's verbal or pointing response, compare it to the correct answer listed on the examiner's screen, and score it accordingly. The next item will not appear until the examiner has scored the item currently on screen; but it will appear immediately after the examiner clicks **Yes** or **No**. If the child is trying but struggling to verbalize the letters, remind him/her that pointing is OK, saying: **You can show me what you see.**

The test will progressively present smaller letters if the child answers correctly or larger ones if the child answers incorrectly, until an acuity score is established. The test will automatically end when the computer has calculated the acuity score. The examiner should click the **NEXT** button to move on to the next section.

NIH Toolbox Administration

Administration Instructions

Once the participant is seated in a chair that is 12.5 feet from the monitor, say: **Now we are going to do an activity where you will tell me what letters you see on the screen. You are going to look on this screen** (point to monitor**) and you will see a letter. Each time, I want you to tell me the letter you saw on the screen. If you are not sure, it is OK to guess. The letters will get smaller and smaller until you cannot really see them. That is ok. We are trying to determine how small they can get before you cannot see them. Are you ready to start? Let's begin.**

Visual Acuity Test (with glasses or contact lenses if usually worn for distance vision):

The examiner should click the **START TEST** button on the examiner's screen. Each time a letter is displayed, say: **Tell me, what letter is this?** (At the examiner's discretion, this can be replaced by: **Go ahead** after a few letters have been displayed.)

It is the examiner's job to use the computer to record whether the response was correct or incorrect by clicking either the **Yes** (correct) or **No** (incorrect) button. The test will progressively present smaller letters if the participant answers correctly and larger ones if the participant answers incorrectly, until an acuity score is found. The test will automatically end when the computer has calculated the acuity score.

NIH Toolbox Administration

Administration Instructions

The participant must have completed the Visual Acuity Test before starting this measure. If he/she has not completed the **Visual Acuity Test**, it will be administered automatically as a part of the **DVA** program before the **DVA** testing begins. If this is the case, review **Visual Acuity Test** instructions that are appended to the end of these instructions.

Show the headgear with rate sensor to the child, saying something like the following (adapt as needed): **Now we are going to do the same activity, but this time you will move your head back and forth as if saying NO. If you move it just right, the letters will appear. This special hat will be on your head so the computer can know if your head is moving just right. If it is, the pictures will show up!**

Say: **To make a picture appear on the screen, you need to move your head, like you are saying NO, or UH-UH. Watch me.** Demonstrate; then say: **Now you try it. Shake your head like you are saying NO.** Give appropriate feedback until the child demonstrates an understanding of the required motion.

Then say: **Now let's put the special hat on and try this. Can you help me put the hat on your head?** Place the headgear securely on the child's head, making sure it is comfortable and correctly adjusted (rate sensor should be on right side of head, with headgear adjustment knob at the back of the head). For small children, the examiner may need to put a stocking cap or other type of form-fitting, child-pleasing hat under the headgear to ensure a snug fit.

A brief training is followed by practice items. If participants do not succeed on the practice, testing will be discontinued.

Training

When the headgear is properly positioned, say: **This time when you shake your head, a picture will flash on the screen. I want you to tell me, or point to, what you see each time. It is OK to make your best guess. When you see the picture flash on the screen, stop shaking your head.**

Practice:

Once the child has learned to move his/her head correctly, there is a practice series with the **HOTV** letters at size 20/400. The child receives ten trials (each trial involves up to three flashes of each letter) and is asked to identify the letters by either pointing to or saying the letters. The child needs to achieve 60 percent (six of the ten trials) correct to continue with testing. When five practice trials are incorrect, the test is automatically discontinued. Alternatively, as soon as the child gets six practice items correct, the program moves on. The practice items will measure leftward head rotation; testing begins with rightward rotation.

NIH Toolbox Administration

Testing:

Click the **START TEST** button and say: **Now we are going to do some more of these. Ready? Go ahead.** The letters will begin at three sizes above the achieved Visual Acuity Test score and will become progressively smaller or larger, depending on the child's performance. A given letter will flash up to three times during head rotation. The child should be encouraged not to answer until he/she is certain which letter flashed; however, after three letter flashes, the letter will no longer appear, regardless of head movement.

If the child has not responded, seems uncertain about his/her answer, or has not used all three trials, the examiner should prompt the child each time by saying something like: **Go ahead** or **Now shake your head NO**. If the child is trying but struggling to verbalize the letters, remind him/her that pointing is OK, saying: **You can show me what you saw**. The examiner should provide encouragement and praise regardless of whether the letter identified is correct, so that the child will continue.

The examiner should record whether the response was correct or incorrect by clicking either the **Yes** or **No** button. The next item will not appear until the examiner has scored the item currently on screen.

The examiner should remind the child as needed that after he/she says or points to a letter in response to what flashed on the screen, he/she should ***stop the head-shaking and wait for the examiner to indicate that it is time for the next item*** (the letter flashes up to three times and the examiner may need to remind the child to stop shaking his/her head while the examiner enters the response).

If the child sees the presentation of a letter multiple times (up to three are possible) and provides different responses, the examiner should go with the dominant response. In a case where the child gives different responses each time, the examiner should score the child's last response to the flashing letter presentation. The test will progress and automatically end when the child reaches the discontinue criterion, or he/she has correctly identified the smallest-size letters presented.

The test is divided into Part 1 (right) and Part 2 (left). Since the participant makes head rotations to both sides (as if saying NO), not in one direction only, no change in instructions is necessary. When the test is completed, the letters will no longer flash.

The computer automatically ends the test after it has determined the dynamic acuity score; then say: **We're all done with this activity.**

NIH Toolbox Administration

Visual Acuity Test Instructions

A laminated card with four letters is used with young participants.

If the child does not succeed in the training (as outlined below), testing should be discontinued.

Training:

Once the child is seated in a chair that is 12.5 feet from the monitor, say: **Now we are going to do an activity that shows us how well you can see pictures on the TV screen.** Hand the child the laminated card and say: **Everything you will see is shown on this card. This is a picture of an H, this is a picture of an O, this is a picture of a T, and this is a picture of a V** (point to each letter while naming)**. Now, you try to name the pictures.**

Encourage the child to name the letters as best he/she can. If the child names all four letters correctly, say: **Good job.** If any are named incorrectly, point to each letter and say ***only one time*** as before: **This is a picture of an H, this is a picture of an O, this is a picture of a T, and this is a picture of a V.** (Because letter naming is not required to complete the test, it is OK if the child does not correctly name each letter. Encourage the child's efforts without providing negative feedback.) Then say: **Let's do some more.**

Say: **You are going to look on this screen** (point to monitor)**; then, you will see a picture** (for children who clearly know the alphabet, it is OK to say letter instead of picture)**. Each time, I want you to tell me or point on this card to what you saw on the screen. If you are not sure, it is OK to guess. Are you ready to start? Let's begin.**

Practice:

The examiner should click the **START TEST** button on the examiner's screen. The examiner will present one set of practice visual acuity trials (four letters) at size 20/400.

a. If the child gets three or more correct, continue to visual acuity testing.

b. If the child misses two or more of four, review the laminated 'pointing chart' and ask him/her to identify (either orally or by pointing) the four letters HOTV. If all are done correctly, see step c below. If child cannot correctly identify the optotypes on the HOTV set, repeat the training above one more time.

c. Proceed to a second practice trial set. If three or more of four are done correctly, proceed to live visual acuity testing. If not, repeat (third practice trial set). If three or more are correct on the third practice trial, begin visual acuity testing. If two or more are incorrect, stop the test since this is the third practice trial (step d below).

d. Practice trials should be limited to a total of three sets. If, after three trials, the criterion of three or more of four correct is not achieved, then stop the test.

NIH Toolbox Administration

Visual Acuity Testing:

The examiner should say: **You did great. Now, the letters will get smaller and smaller until you cannot really see them. That is ok. We want to know how small they can get before you cannot see them.**

The examiner should click **NEXT** on the examiner's screen. Each time a letter is displayed, say: **Tell me or point to what you see.**

It is the examiner's job to use the computer to record (click) whether the response was correct or incorrect. Simply note the child's verbal or pointing response, compare it to the correct answer listed on the examiner's screen, and score it accordingly. The next item will not appear until the examiner has scored the item currently on screen. If the child is trying but struggling to verbalize the letters, remind him/her that pointing is OK, saying: **You can show me what you see.**

The test will progressively present smaller letters if the child answers correctly or larger ones if the child is answering incorrectly, until an acuity score is established. The test will automatically end when the computer has calculated the acuity score. The examiner should click the **NEXT** button to move on to the next section.

NIH Toolbox Administration

Administration Instructions

Introduction

The participant must have completed the **Visual Acuity Test** before starting this measure. If he/she has not completed the **Visual Acuity Test**, it will be administered automatically as a part of the **DVA** program before the **DVA** testing begins. If this is the case, review **Visual Acuity Test** Instructions that are appended to the end of these instructions.

For participants who wear glasses and can understand the question, the examiner should ask: **Are your glasses progressive or multifocal?**

- If the answer is YES, then the examiner should administer **Visual Acuity Test 2** if he or she plans to administer the **Dynamic Visual Acuity Test**. If this is the case, review **Visual Acuity Test** instructions that are appended to the end of these instructions.
- If the answer is NO, the examiner should not administer Visual Acuity Test 2 – only the **Dynamic Visual Acuity Test** (and one **Visual Acuity Test**, if it has not been already administered).

NOTE: For participants with glasses that are multifocal or who have progressive lenses, **DVA** testing should be done without glasses. A second administration of the **Visual Acuity Test** is included in the **DVA** for these persons. Other participants wearing single-vision lenses should continue to wear them for the **DVA** assessment.

The examiner needs to explain to the participant that he/she must wear the headgear to enable the computer to know if his/her head is turning. Show the headgear with rate sensor to the participant, saying something like the following (adapt as needed): **Now we are going to do some more, but this time, you need to wear this special headband to make the letters appear. May I put it on your head now?** Place the headgear securely on the participant's head, making sure it is comfortable and correctly adjusted (rate sensor should be on right side of head, with headgear adjustment knob at the back of the head).

When the headgear is properly positioned, say: **To make a letter appear on the screen, you need to move your head, like you are saying NO. Watch me.** Demonstrate for the participant; then say: **Now you try it. Shake your head like you are saying NO.**

A brief training is followed by practice items. If participants do not succeed on the practice, testing will be discontinued.

Training:

Using a practice trial at 20/400 size, sit with the participant and have him/her make the letters appear with the correct head movement. The examiner can judge the correctness of the movement by watching the moving vertical bar on the computer screen and whether it is in the green range or not (between the numbers 180 and 250). If the participant is not making the correct movement, the examiner may need to demonstrate again; the purpose of this training is to make sure the participant has learned to move his/her head correctly.

NIH Toolbox Administration

Practice:

Once the participant has learned to move his/her head correctly, there is a practice series with the letter size set at 20/400. Now the examiner should say: **This time when you shake your head, a letter will flash on the screen. I want you to tell me what you see each time. It is OK to make your best guess. Once you recognize the letter on the screen, stop shaking your head and tell me your answer**.

Testing:

Click **START TEST;** say: **Now we are going to do some more of these. The letters will be smaller than the ones we just practiced with. Ready? Go ahead.** The letters will begin at three sizes larger than the achieved Visual Acuity score and will become progressively smaller or larger, depending on the participant's performance.

The examiner should use the computer to record whether the response was correct or incorrect by clicking either the **Yes** or **No** button. If the participant does not appear to have seen the letter flash or is in any way unsure of his/her response, allow him/her up to the full three attempts at the letter. The examiner should prompt the participant each time by saying something like, **Go ahead** or **Now shake your head 'NO' again.**

The examiner should remind the participant as needed that after he/she says a letter in response to what flashed on the screen, he/she should ***stop the head-shaking and wait for the examiner to indicate that it is time for the next item*** (the letter flashes up to three times and the examiner may need to remind the participant to stop shaking his/her head while the examiner enters the response).

The test is divided into Part 1 (right) and Part 2 (left), meaning that the letter will only flash for a rightward (Part 1) head rotation and then leftward (Part 2) head rotation. Since the participant makes head rotations to both sides (as if saying NO), not in one direction only, no change in instructions to the participant is necessary. When the test is completed, the letters will no longer flash.

The computer automatically ends the test after it has determined the dynamic acuity score; then say: **We're all done with this activity.**

NIH Toolbox Administration

Visual Acuity Test and Visual Acuity Test 2 Instructions:

Once the participant is seated in a chair that is 12.5 feet from the monitor, say: **Now we are going to do an activity where you will tell me what letters you see on the screen. You are going to look on this screen** (point to monitor**) and you will see a letter. Each time, I want you to tell me the letter you saw on the screen. If you are not sure, it is OK to guess. The letters will get smaller and smaller until you cannot really see them. That is ok. We are trying to determine how small they can get before you cannot see them. Are you ready to start? Let's begin.**

Visual Acuity Test 1 (with glasses or contact lenses if usually worn for distance vision):

The examiner should click the **START TEST** button on the examiner's screen. Each time a letter is displayed, say: **Tell me, what letter is this?** (At the examiner's discretion, this can be replaced by: **Go ahead** after a few letters have been displayed.)

It is the examiner's job to use the computer to record whether the response was correct or incorrect by clicking either the **Yes** (correct) or **No** (incorrect) button. Simply note the participant's response, compare it to the correct answer listed on the examiner's screen, and score it accordingly. The next item will not appear until the examiner has scored the item currently on screen (but it will appear immediately after the examiner clicks Yes or No).

The test will progressively present smaller letters if the participant answers correctly and larger ones if the participant answers incorrectly, until an acuity score is found. The test will automatically end when the computer has calculated the acuity score.

Visual Acuity Test 2 (only for those participants with glasses that are multifocal or who have progressive lenses):

Say: **Now we are going to do this test again, this time without your glasses.**

When the participant has removed his/her glasses, the examiner should click the **START TEST** button on the examiner's screen. Each time a letter is displayed, say: **Tell me, what letter is this?** (At the examiner's discretion, this can be replaced by: **Go ahead** after a few letters have been displayed.) It is the examiner's job to use the computer to record whether the response was correct or incorrect by clicking either the **Yes** (correct) or **No** (incorrect) button. Simply note the participant's response, compare it to the correct answer listed on the examiner's screen, and score it accordingly. The next item will not appear until the examiner has scored the item currently on screen (but it will appear immediately after the examiner clicks Yes or No).

The test will progressively present smaller letters if the participant answers correctly and larger ones if the participant answers incorrectly, until an acuity score is found. The test will automatically end when the computer has calculated the acuity score.

NIH Toolbox Administration

Administration Instructions

For 6-7 year olds

Say: **We are going to do an activity with whistles. For this activity, you get to wear these headphones. Once you put these on, you will hear a person who explains the activity. Your job is to listen carefully and to choose one of these two buttons when the voice asks you to. Let me show you how to choose the buttons.** [Demonstrate button selection]. **You will hear a voice** (in the headphones) **that will help you get started and show you how to do the exercise. I going to put the headphones on you now and then we can get started.**

For 8-85 year olds

Say: **Now I will ask you to wear these headphones. If you are wearing hearing aids, I will ask you to remove them for the hearing test. Once the headphones are on, we will begin testing your hearing. I will ask you to choose your response with the mouse. The computer will give you the instructions. I will put the headphones on you now and we can get started with the instructions.**

Examiner should put the red headphone on the right ear and the blue headphone on the left ear. Adjust the headphone band to provide a comfortable fit. Because wearing the headphones muffles external sounds, while wearing headphones, some participants may not hear the examiner well or at all in the case of some hearing losses. If a participant reports that he/she cannot hear the examiner, remove the headphones when re-instructing the participant and then replace them when you are ready to begin again. If the participant has difficulty using the mouse, he/she may point and the examiner may operate the mouse and/or keyboard. The examiner should say something like the following: **You can point to or tell me your choice and then I will enter your choice.**

The participant should be seated at a table in front of the monitor, keyboard, and mouse. The equipment should be positioned such that the participant can easily and comfortably see the monitor and use the mouse for responding. Like other toolbox measures, the participant-examiner positioning should support the examiner's ability to see and hear the participant during testing and to allow the examiner to interact with the participant, if needed. During the test, the examiner should monitor the participant's progress in the test.

Once the headphones are placed, all the instructions are on the screen and through the headphones.

NIH Toolbox Administration

Administration Instructions

Most instructions to the participants are on the examiner screen.

Note: If a participant wears hearing aids, they should be removed for the duration of this test.

Before placing headphones, examiner should be able to see the participant's face and hear his/her responses. The examiner should introduce the task, saying: **You will hear a woman asking you to repeat various words. Repeat the words she asks out loud so that I can hear you. For example, if you hear her say 'Say the word dog,' you would say 'dog.' If you are not sure what she said, just say what you think you heard. You will also hear people talking in the background. Do your best to ignore them and to focus on the woman's voice asking you to repeat the words. Do you have any questions?** Answer any questions and say: **Let's begin.**

Place earphones on the participant's head, making sure that the right earphone is over the right ear and the left earphone is over the left ear, and click **BEGIN TESTING EAR 1** button.

When all five words at a given level are incorrect, the audio files will stop and the examiner's screen will show: ***Ear 1 testing is completed***. If the participant repeats some words from each of the seven levels, then, when all the audio files are presented, the examiner's screen will show: ***Ear 1 testing is completed***.

Then the examiner should say to the participant: **Now, we are going on to the other ear.** Click the **BEGIN TESTING EAR 2** button. Again, when all five words at a given level are incorrect, the audio files will stop and the examiner's screen will show: ***Ear 2 testing is completed***. If the participant repeats some words from each of the seven levels, when all the audio files are presented, the examiner's screen will show: ***Ear 2 testing is completed***.

NIH Toolbox Administration

Administration Instructions

Some of the instructions are on the screen.

Say: **Now I am going to test your sense of taste. To do this we will be using a salty flavor and a flavor found in tonic water.**

Demonstration instructions for learning to use the scale:

Say: **Before the tasting, I am going to ask you to use this scale to rate how weak or strong some sensations are to you. Some of these sensations are things that you will experience. Some of these sensations are what you will recall experiencing in the past.**

Continue: **This scale ranges from 'no sensation' at the bottom to the 'strongest sensation of any kind' at the top. The top of the scale** (Strongest Sensation of Any Kind) **refers to any kind of experience, for example sound, brightness of light, even those sensations that might be painful.** Point to the scale on the screen and use one finger to indicate the bottom to the top, saying, **This is how you use this scale.** Demonstrate how the participant can use the mouse pointer on the scale.

Continue the demonstration by showing the scale and saying: **You can use the mouse pointer to choose a word on the scale that describes what you experience or what you remember. You can click anywhere on the line. For example, if the sensation you experience is more than 'moderate' but not quite 'strong,' you can use the mouse pointer to mark a spot between moderate and strong.** Demonstrate for the participant.

Say: **Move the mouse pointer until you think it best represents how you feel, and then click on that spot on the scale. If you would like, you can fine-tune your rating by using the up and down arrows on the computer keyboard. When you are happy with the position of the mark, click on the OK button.**

Once the participant has clicked the OK button say: **Let's try some examples.**

The practice trial questions are on both the examiner and participant screens.

Test Items:

Say: **Before we begin, please rinse out your mouth two times with the bottled water and then spit the rinse water into this container.**

Continue: **Now, I am going to ask you to rate the strength of these tastes. First, I will put some of the solution across the tip of your tongue and ask for a rating. To begin, I will put on these gloves.** Show the card to the participant.

Step 1: The examiner should *put on gloves* for the remainder of this measure.

Step 2: Put the swabs into the cups of solution and say: **Then, I will put this sterile cotton swab into the solution.**

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Continue: **Now hold your tongue out.** Starting with Test Item 1, say: **Then, I am going to start on your left side and gently put some solution across the tip of your tongue.**

Test Item 1: Using the cotton swab paint the *quinine* on the tip of the tongue as described earlier, and say: **Now, show me the strength or intensity of the taste on the scale you used before. Keep your tongue out while you make the rating on the scale. Click the OK button when you are finished. If you should accidentally swallow any, it will not hurt you.** Have participant rinse out mouth with bottled water between items; say: **Please rinse out your mouth two times with the bottled water and spit the rinse water into this container.**

Test Item 2: Using the cotton swab paint the *salt solution (NaCl)* on the tip of the tongue as described earlier, and say: **Now, show me the strength or intensity of the taste on the scale you used before. Keep your tongue out while you make the rating on the scale Click the OK button when you are finished. If you should accidentally swallow any, it will not hurt you.** Have participant rinse out mouth with bottled water between items; say: **Please rinse out your mouth two times with the bottled water and spit the rinse water into this container.**

Test Item 3: Hand the participant a small cup with *quinine* and say: **Next, I would like you to sip all of the solution in this cup. Try not to drink the solution, but hold it and gently move it around in your mouth until I tell you to spit it out in this container. If you should accidentally swallow any, it will not hurt you.** Count for three seconds (one-thousand-one, one-thousand-two, one-thousand-three) and then say: **Spit out the solution in your mouth and swallow whatever remains. Then, rate the strength or intensity of the taste on the same scale you used before. Click the OK button when you are finished.** Have participant rinse out mouth with bottled water between items; say: **Please rinse out your mouth two times with the bottled water and spit the rinse water into this container.**

Test Item 4: Hand the participant a small cup with *salt solution (NaCl)* and say: **Next, I would like you to sip all of the solution in this cup. Try not to drink the solution, but hold it and gently move it around in your mouth until I tell you to spit it out in this container. If you should accidentally swallow any, it will not hurt you.** Count for three seconds (one-thousand-one, one-thousand-two, one-thousand-three)and then say: **Spit out the solution in your mouth and swallow whatever remains. Then, rate the strength or intensity of the taste on the same scale you used before. Click the OK button when you are finished.**

After the last item is administered, give the participants the bottle of water and encourage them to drink it and/or rinse some more. The examiner should say: **Now that we have finished, you might want to drink some more water to clean out your mouth.**

The participant may be offered a candy to help overcome any remaining taste in his/her mouth.
(Sugar-free candy may be needed for diabetic participants.)

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Hearing Handicap Inventory for Adults & Elderly - Screening Version

Equipment:
Computer
Monitor
Mouse or keyboard

Description
This set of questions asks the participant to self-report any difficulties with hearing or hearing-related activities. Each participant will answer ten questions. Two of the questions differ for participants ages 18-64 (**HHIA-S**) and those ages 65-85 (**HHIE-S**) years of age.

The questions are introduced by the following text on the computer screen:

> **The purpose of this questionnaire is to identify any problems your hearing may cause you. Click "No", "Sometimes", or "Yes" to answer each question. Do not skip a question if you avoid a situation because of a hearing problem. If you currently use hearing aids, please answer as if you were WITHOUT your hearing aids.**
>
> **After you make your choice, the computer will automatically go to the next question. If you want to change your answer, click on the GO BACK button to return to the question, then choose a different answer.**
>
> **Click the NEXT button when you are ready to begin.**

Note: If a participant has difficulty using the mouse, he/she may point and the examiner can operate the mouse.

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Vision Health-Related Quality of Life Survey

Equipment:
Computer
Monitor
Mouse or keyboard

Description

This self-administered questionnaire asks adult participants to respond to 53 items about their vision (aspects such as color vision; specific problems such as blurriness or headaches; under different conditions such as florescent lighting or night time; while doing different activities). All questions are answered on 5- or 4-point scales: Not difficult at all; A little bit difficult; Somewhat difficult; Very difficult; Unable to do because …; or No problem at all; A little bit of a problem; Somewhat of a problem; Very much of a problem.

The items generate scores on six separate subscales: Color Vision; Distance Vision; Near Vision; Ocular Symptoms; Psychosocial; and Role Performance.

The instructions to the participants on the screen read:

On the next screens, we will ask you questions about how your vision affects your life. Answer the questions thinking of your vision as it is when corrected by any glasses or contact lenses that you usually use. Read each question carefully and answer as well as you can. After you make your choice, the computer will automatically go on to the next question. If you want to change your answer, click on the GO BACK button to return to the previous question and then choose a different answer.

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